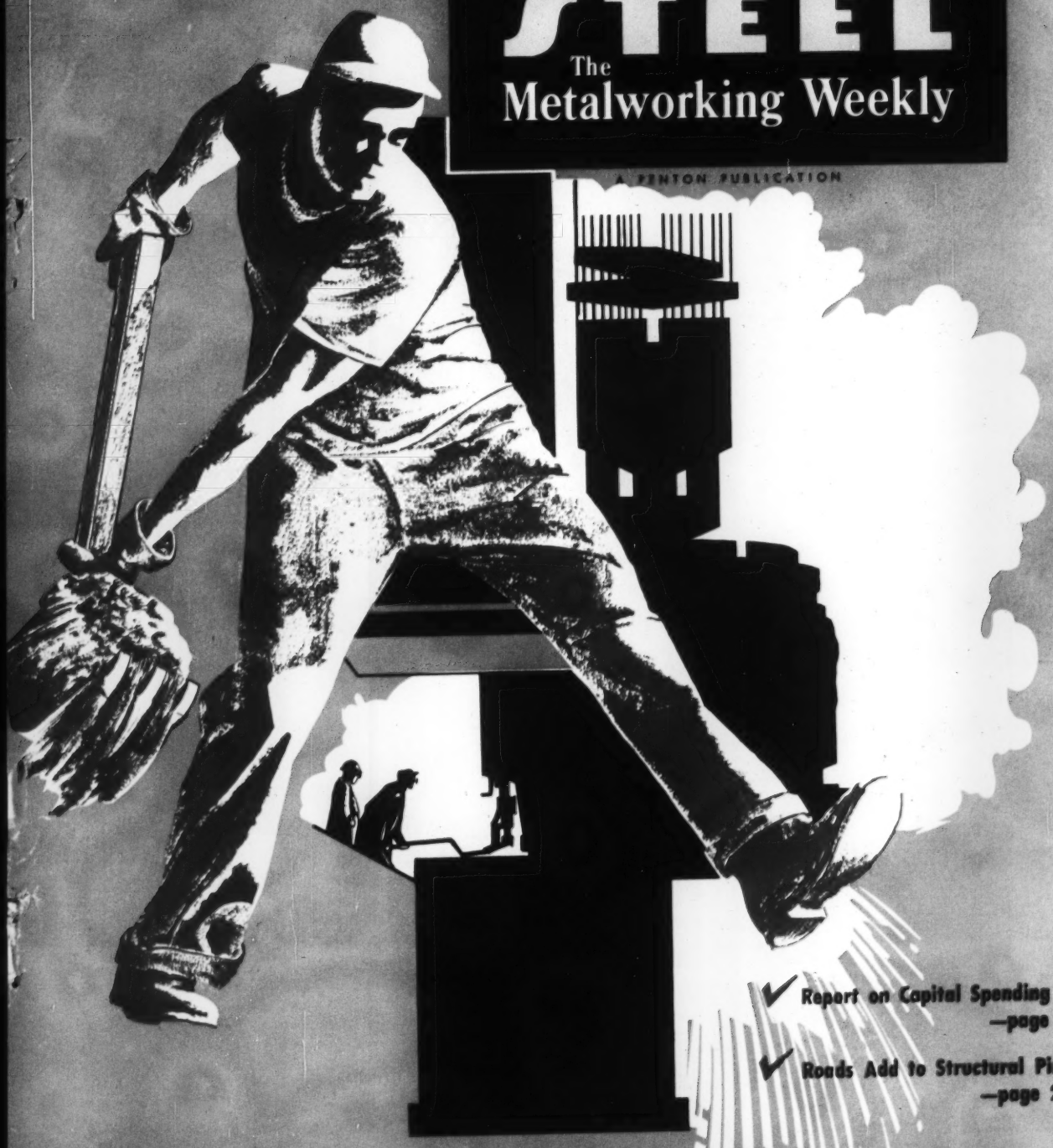
SEPTEMBER 17, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



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✔ Roads Add to Structural Pinch —page 227

Steel: A Giant Grows

Its capacity will rise 23.4 million tons through 1960 . . . page 134

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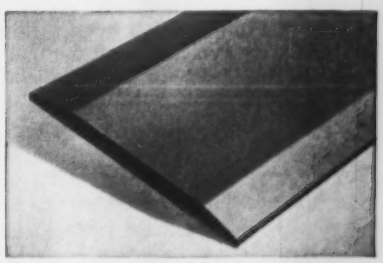
Would you like to know more about Bethlehem hot-rolled special sections? Please call on the nearest Bethlehem sales office.



This double-bevel special section requires very little grinding . . . makes a strong, durable blade.

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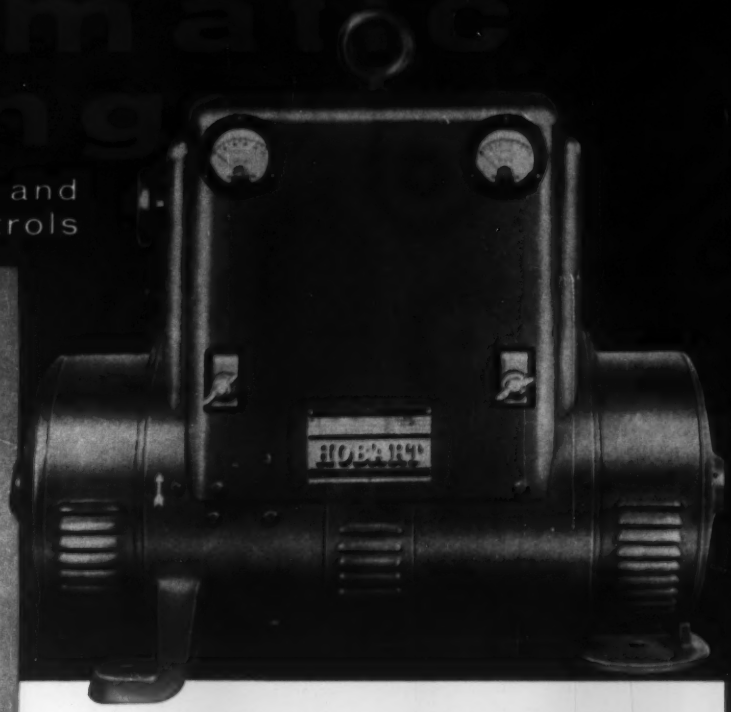

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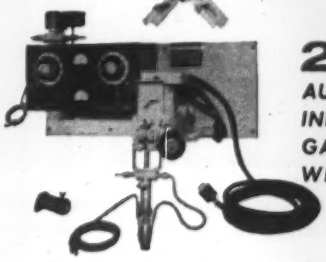

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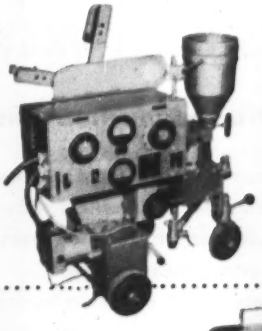

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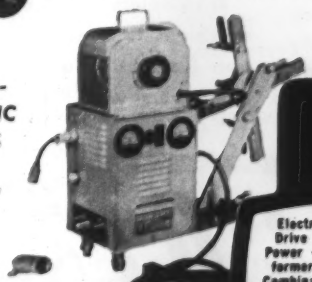

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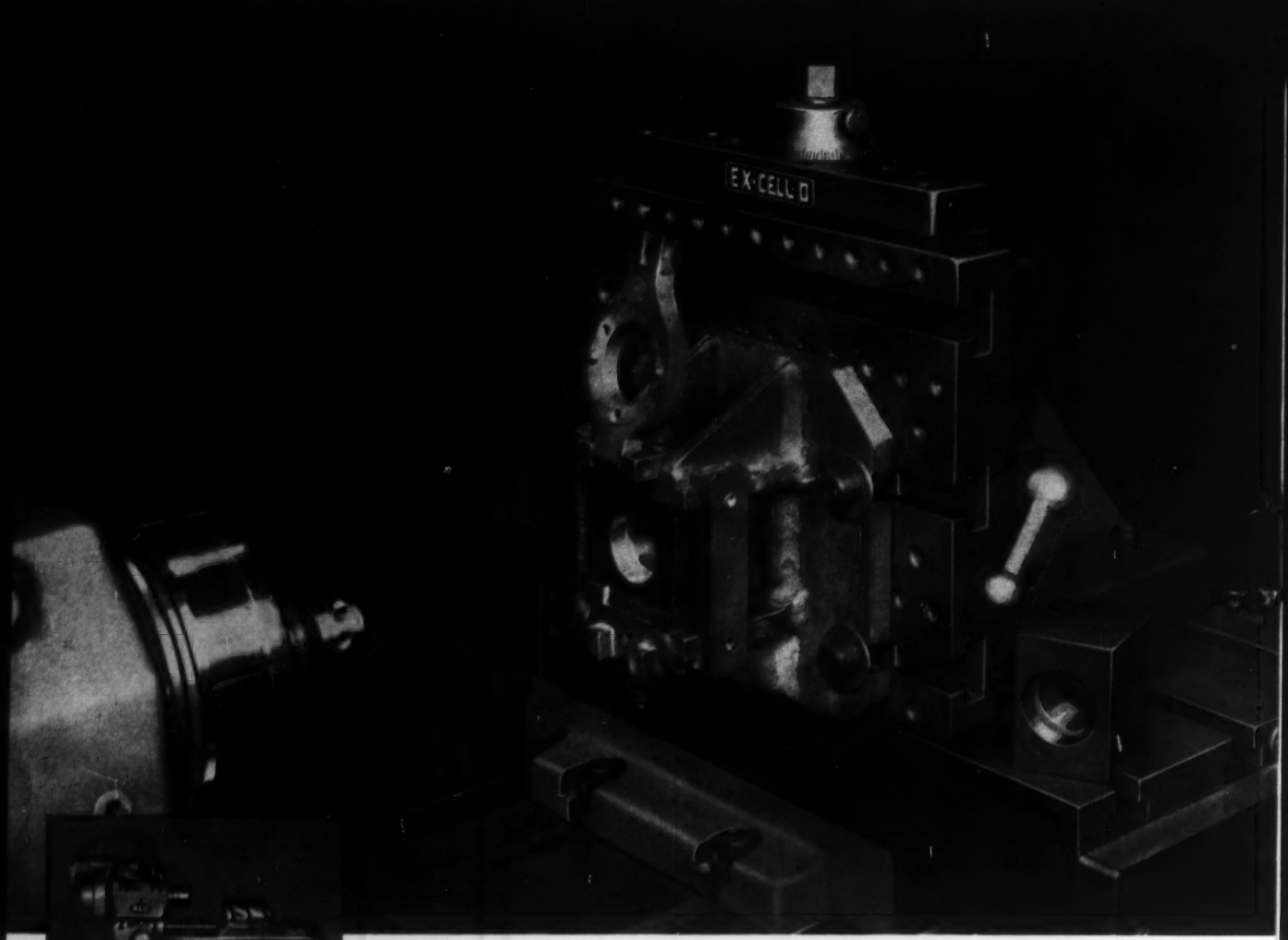

Close-up view of Ex-Cell-O Precision Boring Machine equipped with a single spindle and a universal fixture for small lot production.

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56-51

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The Metalworking Weekly

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behind the scenes

In Search of a Character

The 1956 Convention and Exposition of the Association of Iron & Steel Engineers moves into town Sept. 25, and visitors to Cleveland will be happy to learn that they won't be obliged to wade through pigeons on their way across Public Square toward Convention Hall. The city hired a mad scientist, we heard, and darned if he didn't thin out the pigeons, without harming a feather, either. The Society for the Prevention of Cruelty to Pigeons is confused—but why in the world are we talking about pigeons, when we are concerned with the AISE, and STEEL's coverage of same?

In this issue, the editors present a scoreboard of planned expansions, to bring you up to date on steelmaking facilities. It rounds out a list that appeared in your favorite metalworking weekly Mar. 5 of this year. And this week's issue, of course, carries a wealth of information on the Iron & Steel Show; in fact, it is called the Steel Show Issue. Well, as is customary, a great deal of preliminary work had to be done before this edition of STEEL was assembled in its final form. One of the first considerations was the cover. It was decided to incorporate a figure of the legendary steelman, Joe Magarac, pronounced Ma-ger-ac, accent on the first syllable. Artist Tom Welsh agreed to paint Joe, but requested information about him first.

U.S. Steel to the Rescue

"Who the heck is this Magarac character?" he demanded. "What's he supposed to look like? How is he dressed? Goodness gracious." (Ah, you don't catch us putting improper words into the mouths of young artists!) "You can't expect me to paint something I never *heard* about. You might just as well ask me to draw a portrait of my mother-in-law."

"I didn't know you were married," said Associate Managing Editor Vance Bell.

"I ain't," Tom replied. "That's just the point."

It so happened that Vance didn't have a clear conception of Joe Magarac either, so he quickly called Lew Zender, head of public relations, U.S. Steel Corp., Cleveland. Lew, of course, was well acquainted with the legendary Joe Magarac. "He belongs with Paul Bunyan and John Henry," he explained. "He is an alloy of several tales that were brewed in the racial melting pot of our steel towns. He may have been concocted in part out of the doings of such supersteelmen as Bill Wiche, a 7-foot tall Pittsburgher of the late 1870s who could push a loaded ingot car by himself; or old Cap Jones, Andrew Carnegie's greatest mill superintendent who worked on Sundays. I'll send you some literature."

Lew then told Vance: "I was explaining the Magarac legend to some of the men in the plant. One of the men said I had it all wrong. 'It ain't Magarac,' he says, 'it's MacGarick, and if that Magarac of yours ever met up with MacGarick you'd know in a hurry what I'm talking about!' "

The Mighty Magarac

All this is a lengthy and somewhat tiresome preamble, perhaps, explaining why the gentleman on this week's cover is using the scoop from a steam shovel to toss raw material into an open hearth. He is Joe Magarac, the steel-bodied, steel-boned strong man, the legendary hero of the steel industry. Seven feet tall, with wrists a foot thick and shoulders so broad he has to enter a mill gate sideways. He can bite steel sheets in half, test the temperature of metal with his bare hand and twist a 1700-lb dolly bar into a figure eight with three fingers.

We can't think of a more convincing character to welcome the Association of Iron & Steel Engineers to Cleveland for their Convention and Exposition. We can't think of a more convincing (Adv't.) magazine than STEEL to keep the iron and steel boys hep to what is going on in the metalworking world. However, the most exciting thing we can *really* think of is a showdown between Magarac and MacGarick!

Shirdlu

(Metalworking Outlook—Page 85)

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- ...better operator vision
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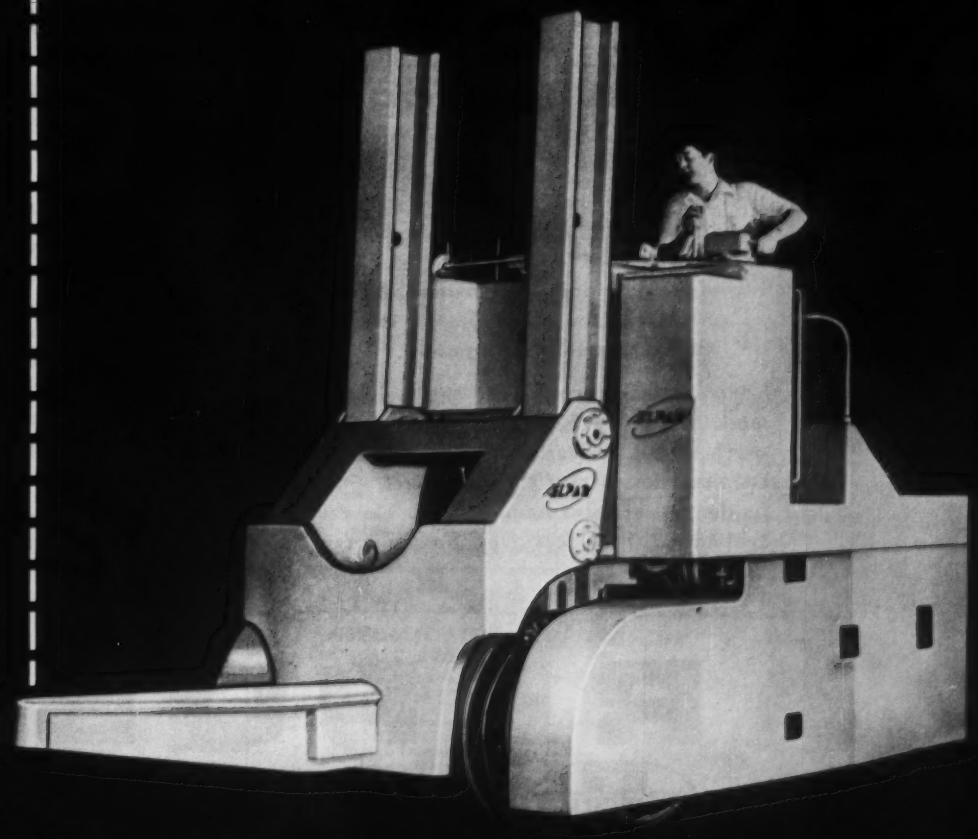
See You at the

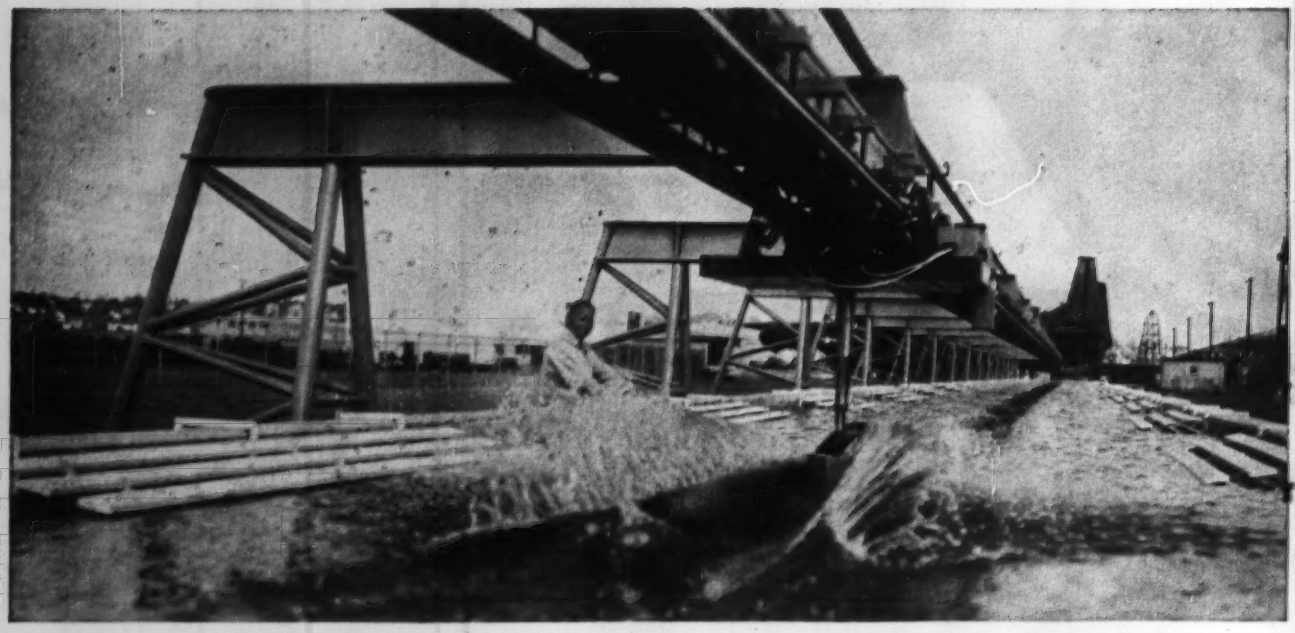
STEEL SHOW

SEPT. 25-28

BOOTH 484-489



THE ELWELL-PARKER ELECTRIC CO., CLEVELAND 3, OHIO



Above photo shows spray pattern as model hull slices through the water. Data recording devices travel with the model over stainless steel rails. High-speed motion picture cameras record hull performance through heavy plate glass windows in sides and bottom of tank.

New use for Stainless Steel developed by Convair in testing seaplane hull models

Stainless steel bars are playing an important part in testing hulls for advanced-type seaplanes at Convair's new 300-foot model seaplane towing tank, first unit of a proposed $800,000 hydrodynamic laboratory. Convair is a Division of General Dynamics Corporation.

Testing is conducted by suspending a hull model from a carriage which runs on a double overhead rail. The rails are 1¼"-dia. cold finished stainless steel bars. Carriage rollers which run on the bars are also stainless steel. The rails are suspended three feet over the water level on "I" beams and tubular steel framework towers.

Stainless steel was selected for this application because of its extremely high resistance to corrosion, wear and abrasion—resulting in ease of maintenance. Cold finishing the bars provides the additional benefits of higher tensile and yield strength, close tolerance, uniform soundness and a fine surface finish permitting smooth, accurate operation of the testing device.

Stainless steel is the aircraft metal of many uses. It has literally thousands of both ground and air applications. Its exceptionally high

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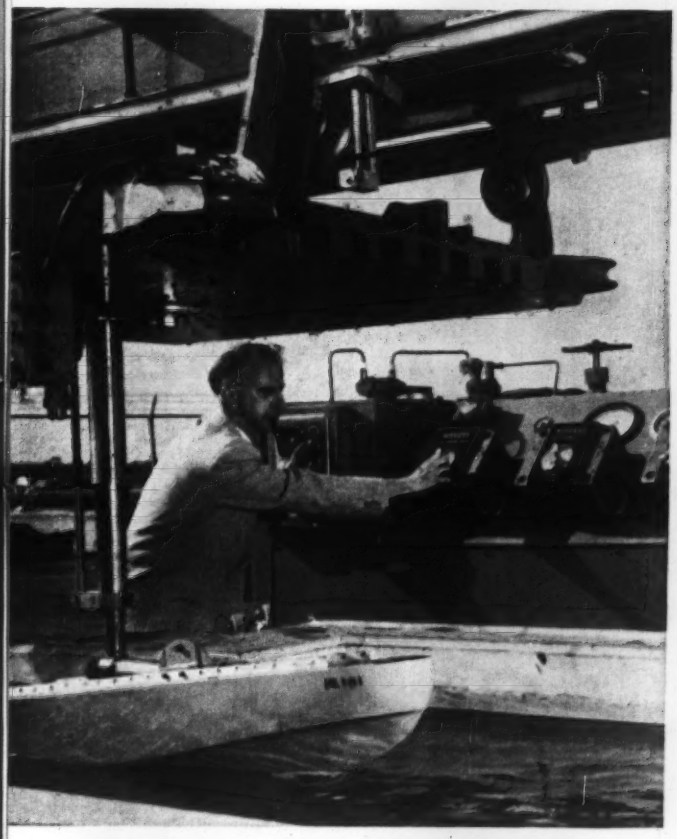

Seaplane hull model is poised for run down 300-foot long towing tank. When complete, entire facility will be 700 feet in length and will be enclosed in a windproof structure to prevent gusts and inclement weather from interfering with tests.

strength-to-weight ratio permits the use of thinner, lighter sections. Use it to gain space or save weight without any sacrifice in strength or safety. Or use it to resist heat, corrosion and abrasion.

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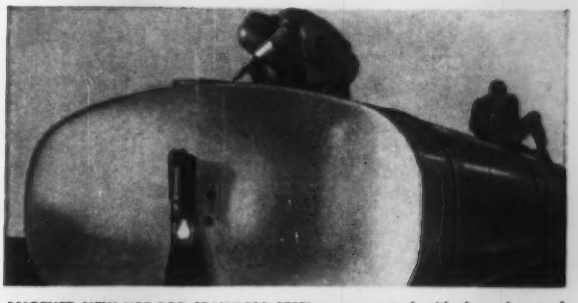
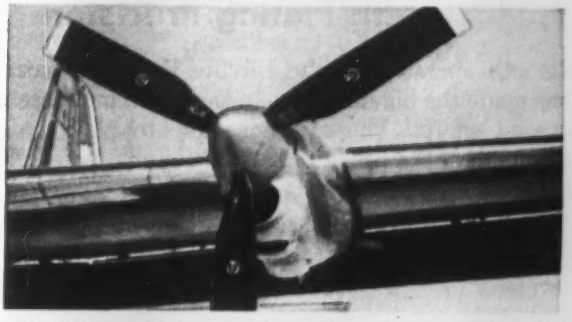


ANOTHER NEW USE FOR STAINLESS STEEL was created with the advent of the turboprop engine. Tank trucks used in refueling turboprops consist of two separate compartments. One is fabricated from Republic ENDURO Stainless Steel to resist the corrosive effect of the alcohol-water mixture. The other, for kerosene, is made from Republic 50 High Strength Steel for lightness and strength. The compartments are then welded together into one strong unit.

NEWCOMER AMONG AIRCRAFT METALS—TITANIUM saves weight and cuts cost in Navy helicopter. Use of .016 gage Republic Titanium, Type RS-70, Annealed, for firewall sections between pilot and engine compartments has resulted in substantial savings in weight and production costs. This type has good forming qualities and a minimum tensile strength of 80,000 psi. Republic melts and rolls titanium in all forms.



NEW EXTRUSION PROCESS AND ALLOY STEEL combine to provide greater strength and resistance to fatigue with minimum weight in turboprop propeller blades. The extruded blade, produced by the controlled extrusion process developed by Curtiss-Wright, starts as a single-piece billet of Republic Alloy Steel. The outstanding qualities of Republic Alloy Steel together with the extrusion process have resulted in a superior blade and increased production with reduced cost.

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LETTERS
TO THE EDITORS

Company To Try Leaded Steel

I would like several copies of the report, "New Technique: Lead in Steel Forgings" (Aug. 13, page 100).

We have received some of these leaded forgings and will be machining them soon. They will be made into gears (which we use a large quantity of) in the manufacture of pumping units.

This is new with us, and we are glad to get information. We will run tests to see which is the best in every respect.

William A. Skelly
Chief Inspector
Bethlehem Supply Co.
Subsidiary of Bethlehem Steel Corp.
Tulsa, Okla.

Business Needs Backbone?

I have read your editorial, "Is Bigness Bad?" (Aug. 27, page 45), and agree heartily with your views. Particularly those about the remarks which always come from the Democrats concerning business.

The question I have always asked is: Don't the businessmen in the Democratic party have any backbone?

They must surely recognize that business suffers by adverse publicity. Are they playing ball for selfish short term gains at the expense of our way of life?

Roy H. Larson
Vice President-Manufacturing
Indiana Forge & Machine Co.
East Chicago, Ind.

Strike Hurts Fabricators

I was surprised to read the editorial, "A Congress for Ike!" (Aug. 6, page 75).

To me, STEEL is a magazine which devotes itself to those in the steel industry, both manufacturers and fabricators. A political editorial of this kind—affecting as it does many who do not believe necessarily in Republican principles—is offensive to those of us who believe that a magazine of this character should not get into politics.

May I point out that whereas your editorial speaks about no amendments to the Taft-Hartley Act, Mr. Eisenhower did not even call on the provisions of this act to reduce the length of the ridiculous "phony" strike which recently took place. This necessitated many contractors disappointing general contractors in such things as school buildings.

The structural steel fabricators already this year have had two to three months of their own raw material eliminated by these same mills which figured that this phony strike was going to help them and possibly the automobile industry.

At the termination of a strike, they

(Please turn to page 12)

Fruehauf industrial trailers utilizing Yoloy "E" in their construction are: (above) three-compartment, 6300-gallon gasoline transport, and (right) 5000-gallon, 2-inch insulated hot asphalt hauler.

providing stronger, higher payload transport trailers

Keeping our millions of autos on the road—requires the most efficient and economical gasoline transports and asphalt haulers that today's industrial trailer industry can produce. Youngstown's Yoloy "E" Steel plays a prominent part in this picture.

In the two Fruehauf trailers (shown above) for transporting gasoline and asphalt, Yoloy "E" high strength low alloy steel is used to insure structural strength, decrease dead weight and increase payload capacity. Trailer components such as side sheets, top ribs, baffles, bulkheads, stiffeners, inner tanks and outer shells are all fabricated from Yoloy "E". The corrosion resistance of Yoloy "E" gives Fruehauf equipment a much longer service life—which helps build customer profits and satisfaction.

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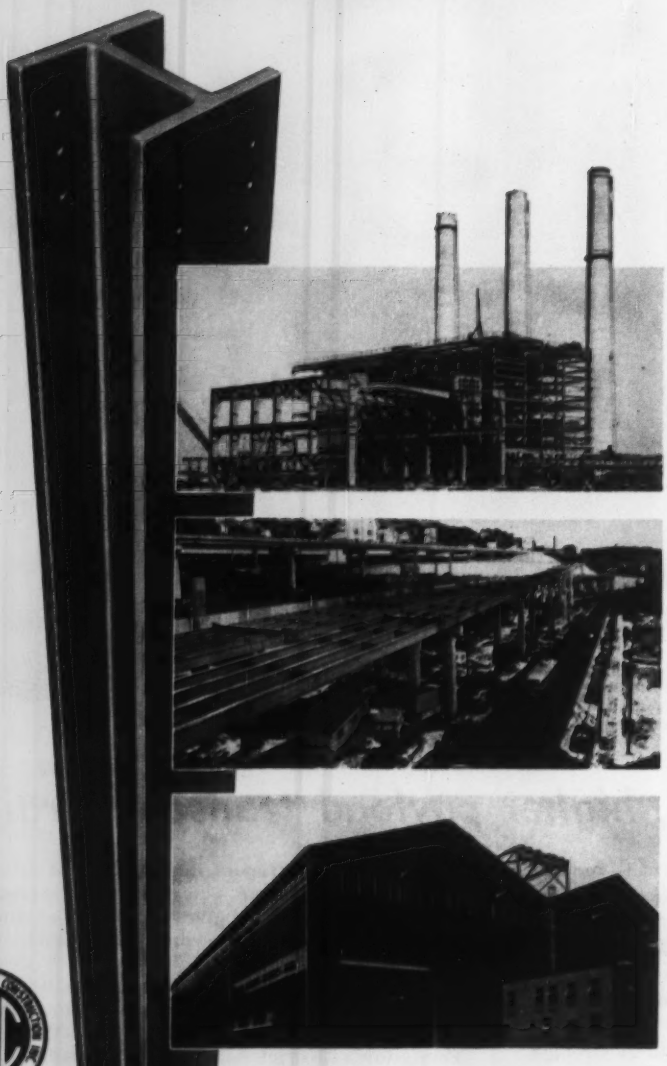
Wherever Structural Steel Fabrication and Erection are involved . . . .

Consult FORT PITT



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LETTERS

(Concluded from page 10)

can increase the price to all who had placed orders many months before—frequently on jobs for which a fixed price has been quoted, which is true, as a rule, of almost all municipal jobs. This does not affect them as it does the hundreds of fabricators in this country who are dependent upon the mills to furnish steel at the right time.

Instead of voicing your ideas on political subjects, we suggest you look into the possibilities of going back to the quarterly price situation which prevailed before World War II. In this situation, those of us who buy steel are at least warned ahead of time when the price of steel is going up.

The present setup is of tremendous advantage to the mills; they cannot fail to immediately recoup as quickly as possible what they are spending in increased wages.

A Small Steel Fabricator

Concise Subject Presentation

Please send a copy of the article, "Atomic Planes Are Closer Than You Think" (Aug. 20, page 116). It is a most interesting, concise and informative presentation of the subject.

Robert N. Green
Fuel Control Engineering
AC Spark Plug Division
General Motors Corp.
Milwaukee

Combating an Evil

The article, "How To Cut Absenteeism" (Aug. 27, page 58), which shows what Inland Steel Container Co. is doing to combat this evil, is excellent. We would appreciate three copies to help our supervisors with the same problem.

Marvin Selig
Structural Metals Inc.
Seguin, Tex.

Latest Nitriding Techniques

Please send a reprint of the article, "Another Look at Nitriding" (Aug. 20, page 134). We have found this article to be most informative.

John J. Brenza
Staff Metallurgist
Metal Products Division
Koppers Co. Inc.
Baltimore

More on Inchworm Motor

Could you please send further particulars on the actuator described in the item, "Inchworm," in the July 23 Technical Outlook column (page 77)? Called an Inchworm motor, it creates motion by magnetostriction.

We are interested in obtaining a description of its principle and the name of the company manufacturing it.

Joseph Tolcias
Senior Engineer
Fairchild Graphic Equipment Inc.
Division of Fairchild Camera & Instrument Corp.
Jamaica, N. Y.

• *Briefly, an electromagnetic field shrinks and then expands a special nickel rod as the field is energized and then de-energized. A pair of clamps at the rod ends act in conjunction with the expansion to impart feed to the machine.*

For more complete details, contact the manufacturer: Airborne Instruments Laboratory Inc., 160 Old Country Road, Mineola 17, N. Y.

NEW!

CLARK AISE-NEMA BRAKE

Bulletin 106, Type "B"

with many exclusive features for

- **MORE DEPENDABLE OPERATION**
- **EASIER MAINTENANCE**
- **GREATER SAFETY**

This new line of CLARK Bulletin 106, Type "B" heavy-duty DC brakes conforms completely to AISE-NEMA standards. Economies in overall size are achieved without sacrificing ruggedness or dependable operation. The new design retains the famous "nut-cracker" principle of former Clark brakes, which assures equal distribution of applied pressure. And it incorporates many entirely new features for greater safety and easier maintenance.

The first of these new brakes to be available is the 13-inch wheel size illustrated. Other sizes to follow.

features...

- Equal distribution of shoe pressure against wheel
- New simpler and easier method of replacing shoes
- All maintenance adjustments made from the top
- Single adjustment for air-gap. Built-in indicator
- Magnet can be removed and replaced without disturbing brake adjustment or releasing the brake
- Coil replacement easily accomplished on the job
- Wheel and motor armature removable as a unit without disturbing brake adjustment
- Cast steel construction—cast aluminum shoes

—and many others

See this brake demonstrated at the Iron and Steel Show, Booths 89, 90, 111 and 112.

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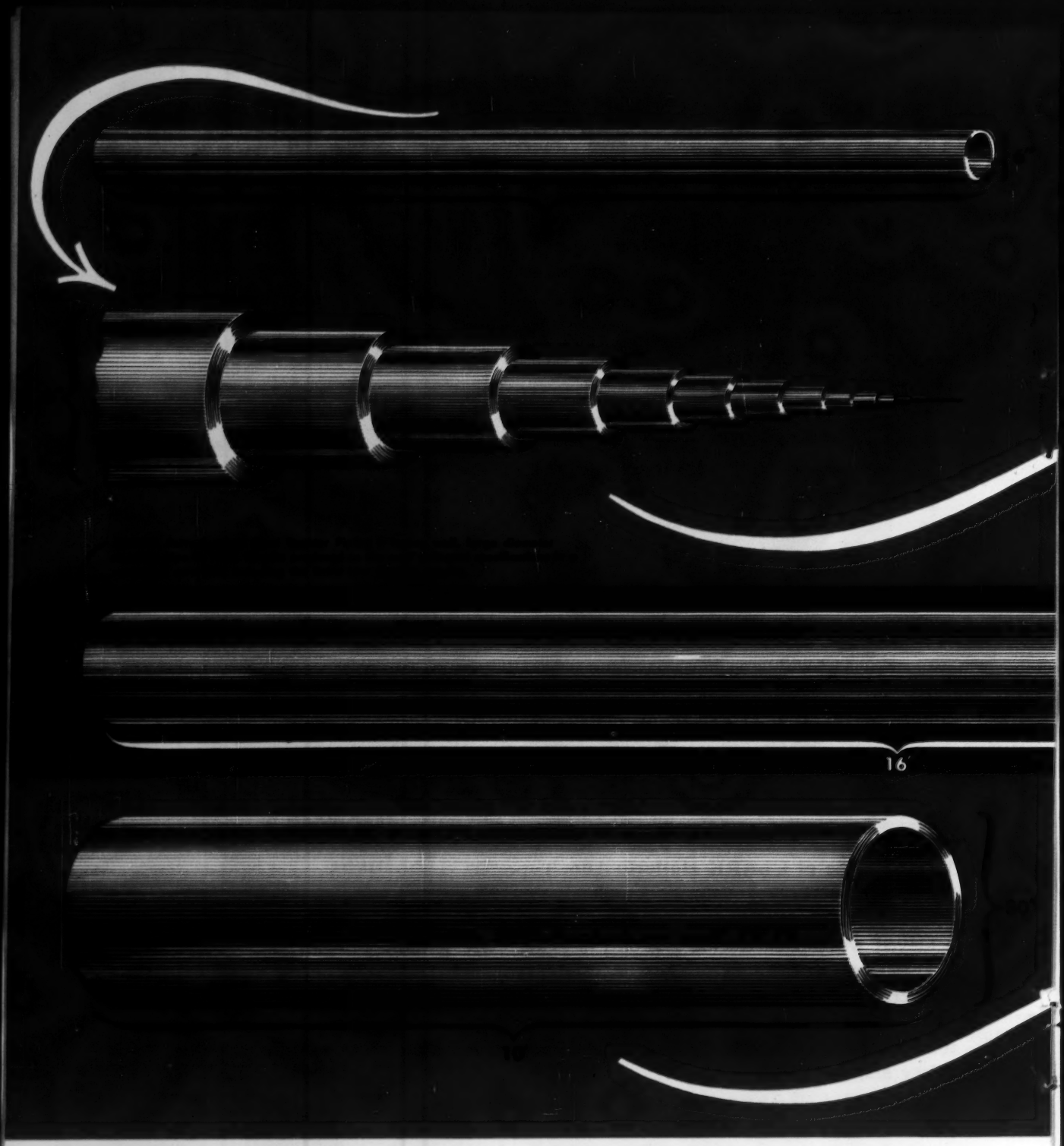

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Steel and Tubes Division

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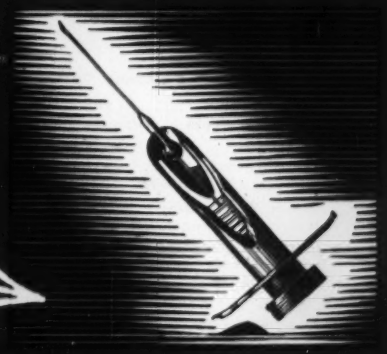
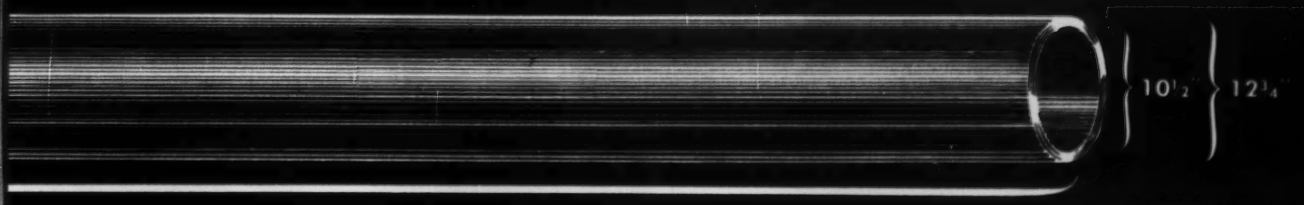
3 PROBLEMS
each different

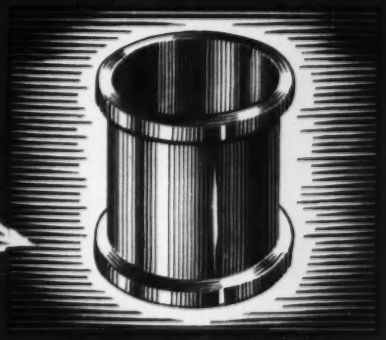
1 SOLUTION...
stainless steel
Centrifugal Castings



Heavy Wall stainless steel pipe, centrifuge bowls, hollow billets for finely drawn hypodermic needle tubing . . .

These are among the many end uses for metal mold centrifugally cast cylindrical shapes. They are typical of the exacting, difficult service conditions to which this product is subjected. All three examples shown demonstrate the fundamental versatility of this manufacturing process—unequaled product soundness—from hypodermic needle stock subjected to the repeated stresses of cold reduction, to the centrifuge bowl spun





at 1800 RPM, to the petrochemical plant reactor piping that must pass hydrostatic pressure tests equal to 90% of the Yield Strength of the metal. These are the proving grounds of quality—of the ability to meet even the most exacting of product specifications.

We welcome your inquiries. For descriptive literature on the versatile metal mold process, write to United States Pipe and Foundry Company, Steel and Tubes Division, Burlington, N. J.

Study these advantages for your cylindrically-shaped products

- Reduced processing time and increased production.
- Design of parts to suit the specific job requirements by selecting the correct alloy – not the next best available alternate.
- Conservation of expensive metals and alloys – especially on tubular parts now produced from solid sections.

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter—6" to 50"
Wall Thickness—⅜" and up
Length—Up to 16'
Types of Stainless—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 P H, 17-7 P H and E.L.C. grades.

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and up
to your EXACT requirements
from the BIGGEST little Converting Mill in the country.

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COlony 9-2771
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Established 1924

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Users everywhere report similar experiences. In fact on 67 machining tests in 11 large machine shops castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer grained, denser, stronger, yet they COST YOU NO MORE — because your foundryman using FERROCARBO makes more whole castings in less material, cuts

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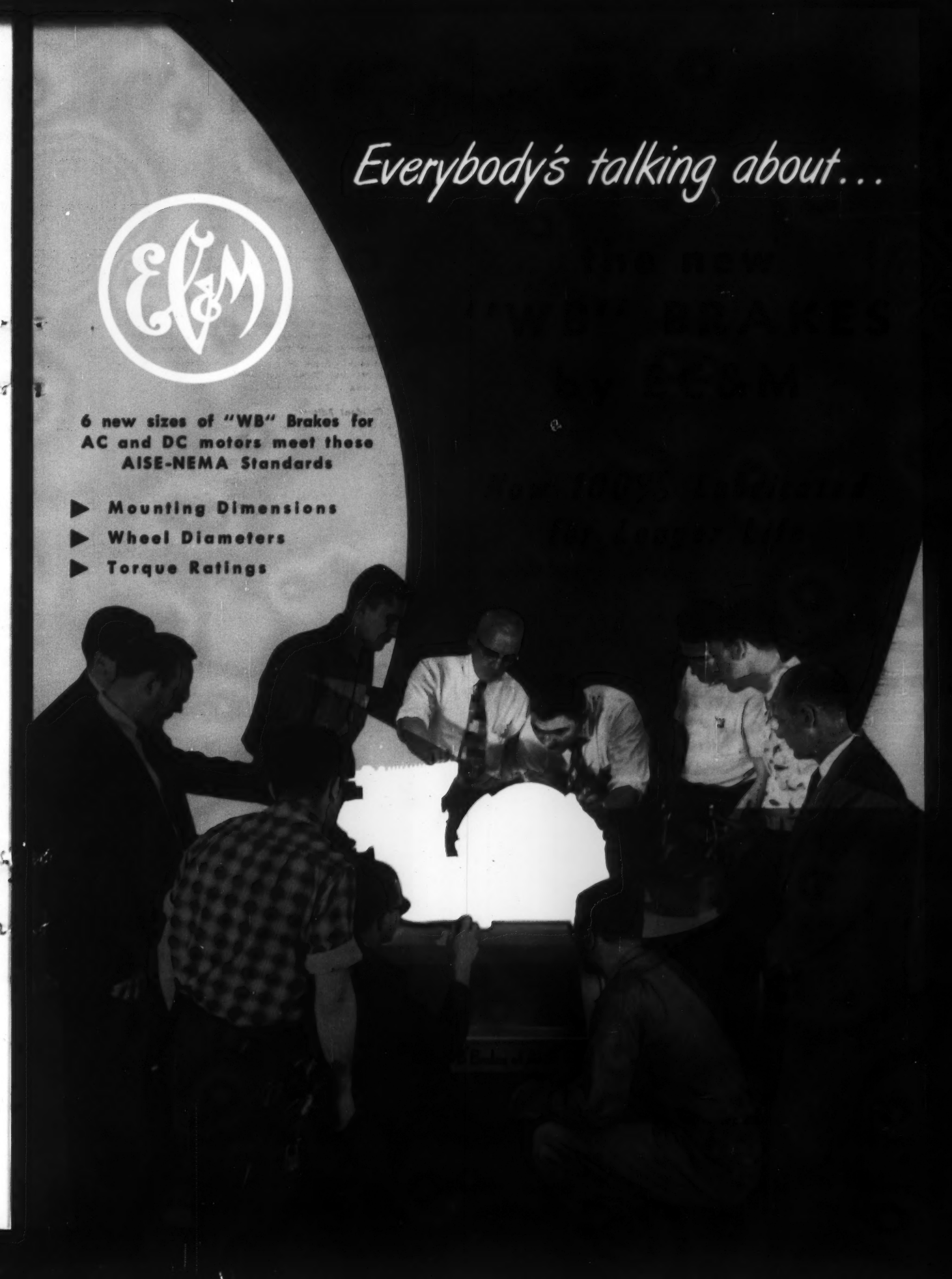

Everybody's talking about...
E V & M
6 new sizes of "WB" Brakes for AC and DC motors meet these AISE-NEMA Standards
Mounting Dimensions
Wheel Diameters
Torque Ratings

these improvements
EASIER TO MAINTAIN

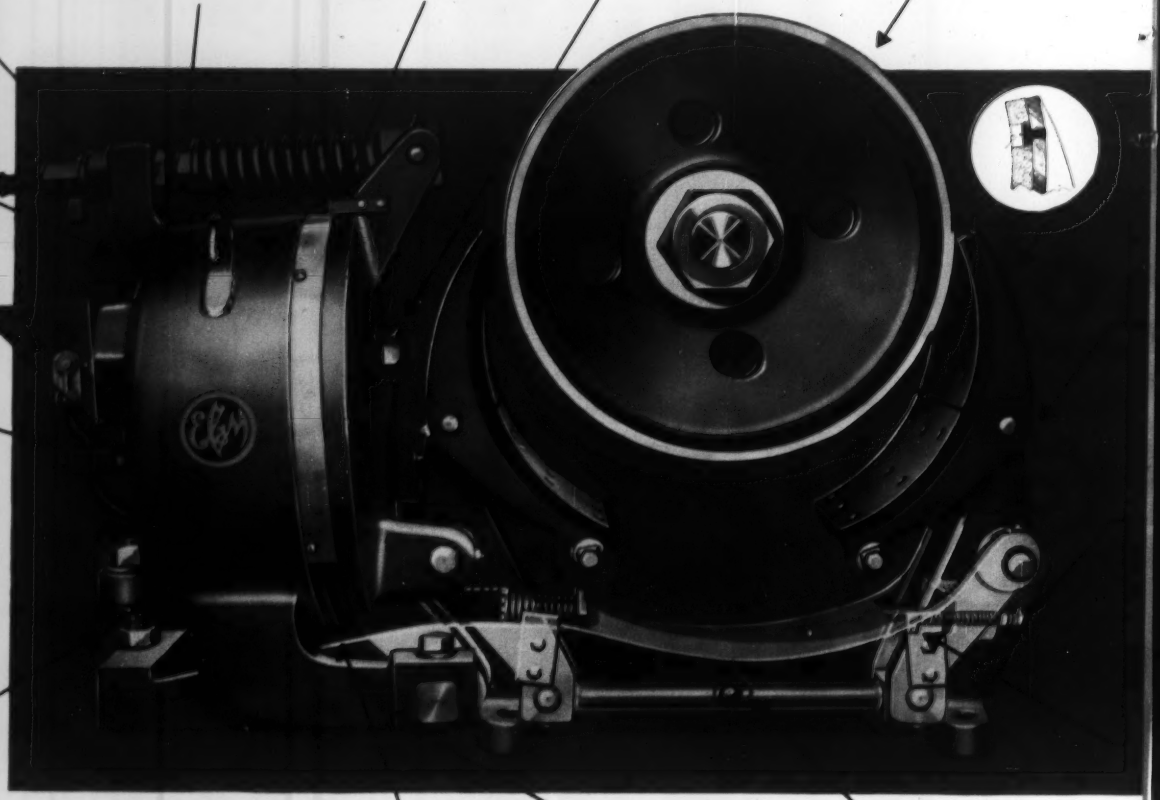
Manual release is standard on all sizes of these AISE-NEMA WB Brakes.

Bronze adjusting-nut on torque-spring rod has fine pitch threads for easier and closer adjustment.

Armature air-gap indicator shows visually when adjustment is needed to compensate for brake-lining wear.

100%-lubricated forces dirt out, all bearings alemite-lubricated.

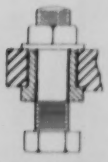
ECAMITE wheels are furnished as standard on all "WB" Brakes.



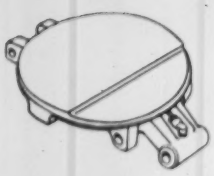
Magnet-case remains **stationary** and contains unit, armored coil.

Coil leads with **solderless connectors** under protective shield. Conduit connection box is optional.

Cable clamps for customer's incoming leads.



Single adjustment for brake lining wear. Adjusting-nut screws into stainless steel threaded bushing in magnet-case. This gives longer threaded path for greater bearing surface — easier adjustment — only single wrench required. Nut on top locks against machined surface.



Armature-face recessed at bottom allows dust to fall free — prevents clogging.

Magnet-case removable as a unit without disturbing remainder of brake.

Connecting lever remains **below the brake wheel** and is of tubular construction. Alemite fitting (on both sides) permits greasing four bearings from this one fitting.

ARMORED COIL CONSTRUCTION

WB Brake coils . . . protected by a steel enclosure, permit quick coil removal. After vacuum-impregnating with No. 371 polymerizing varnish and baking, coil is sealed in its protective enclosure with No. 372 Epoxy compound. This compound does not soften, but holds the coil securely against movement.

make the new "WB" brakes

. . . LONGER LASTING!

Molded brake blocks, riveted securely in place, are made from an improved material having a higher coefficient of friction. Permissible wear is ⅛" on the smallest size to 7/16" on the largest size.

Fixed bearing-pins locked with stainless steel setscrews reduce number of lubrication points.

This adjustment equalizes clearance of both shoes.

Hardened steel camrails retain clearance between shoes and wheel with brake released.

These new EC&M "WB" Brakes are built to AISE-NEMA standards. The basic principles which made "WB" Brakes the outstanding brake for heavy mill service have not been changed. The new design includes several improvements making EC&M "WB" Brakes even longer lasting and easier to maintain. These improvements are:

1 — 100% lubrication . . . for longer life, for freedom of operation by forcing dirt out of bearing surfaces.

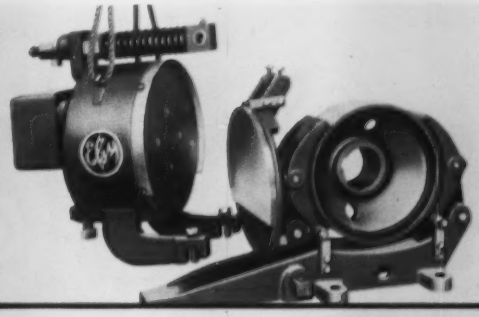
2 — Recessed armature . . . eliminating pocket for dust collection.

3 — Single wrench adjustment for brake-block wear . . . restores air-gap to normal, adjusting-nut has fine pitched threads.

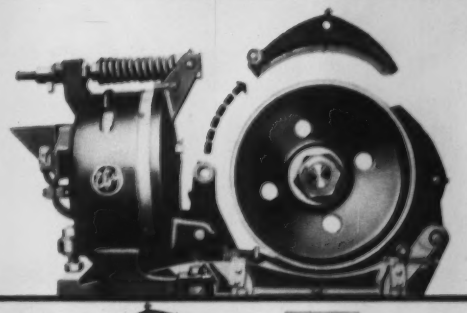
Remaining unchanged because of their proven acceptance and time-saving advantages are these features:-nothing over the brake wheel, manual release, single adjustment for lining wear, stationary magnet and sturdy 2-shoe construction.

These new EC&M "WB" Brakes are available with series and shunt coils for d-c service, and are supplied for rectifier-operation on a-c circuits. For LONG-LIFE Brakes, specify "WB" Brakes by EC&M.

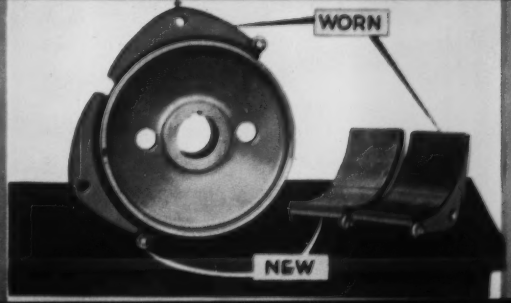
SIMPLIFIED MAGNET REMOVAL
Maintenance men appreciate the time-saving construction that makes coil changing a simple procedure. The magnet case can be swung away without disturbing the remainder of the brake. A coil can be replaced quickly or a complete new magnet installed in a matter of minutes.

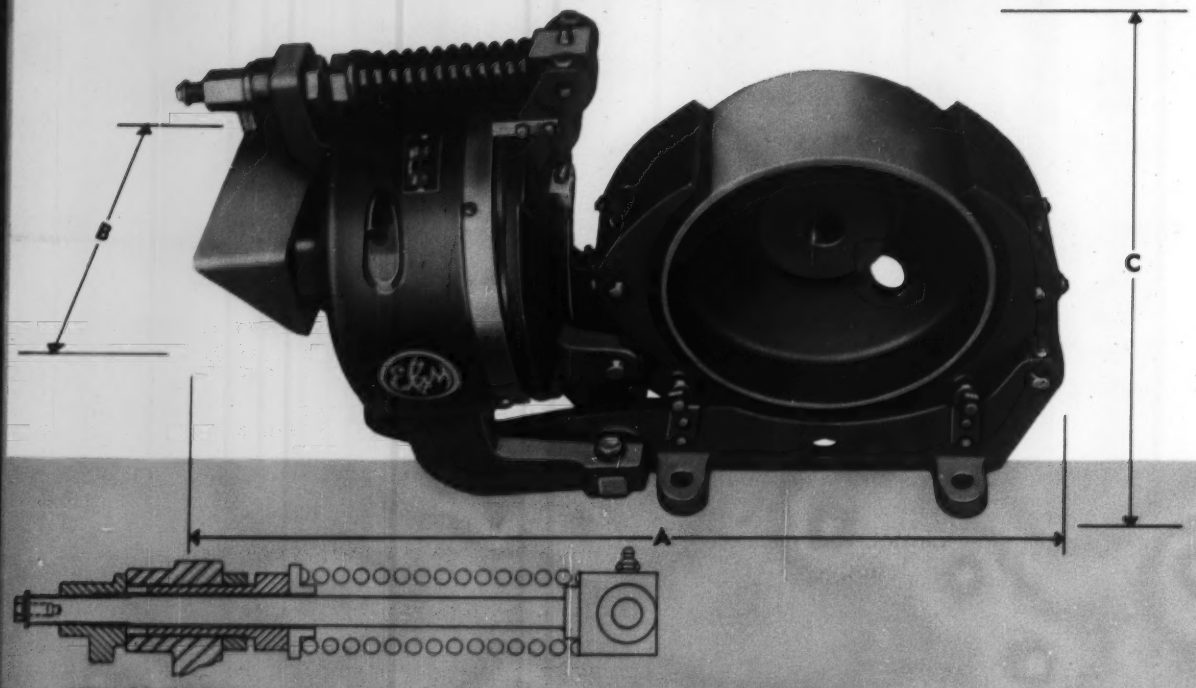


SHOES AND LINERS EASILY REMOVED
With shoe bearing-pins slipped out, shoes slide up on top of the wheel easily to permit worn brake-linings to be replaced. This has been standard construction with "WB" Brakes for years.



ACCURATELY FORMED RENEWABLE BRAKE BLOCKS
WB Brake Blocks retain their frictional quality longer than any other braking material. They are accurately formed so that new blocks fit the arc of the wheel and shoe surface as accurately as the original block.

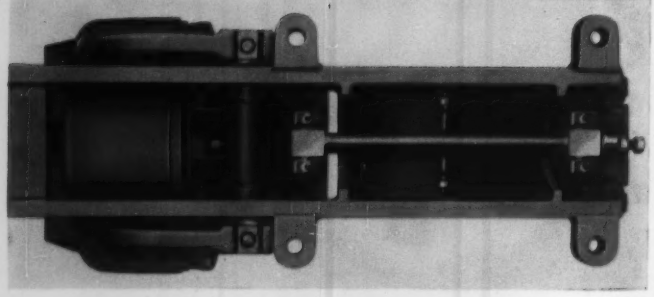




NEW OPERATING SPRING CONSTRUCTION

Operating spring force transmitted directly to magnet armature. Guide rod, threaded only at outer end under manual release (bronze) nut, is under tension only when brake is manually released. Brake torque is adjustable by a bronze nut threaded into the magnet-lug. Fine pitch threads permit closer and easier torque-adjustment. A jam-nut locks the setting.

Brake Size (Wheel Diameter)	600-Series Motor size	BRAKE TORQUE RATINGS in Lbs. Ft.				Approximate Outline Dimensions in Inches		
		Series-Wound Brakes		Shunt-Wound Brakes				
		½ hour Rating	1-hour Rating	1-hour Rating	Continuous Rating	Length "A"	Width "B"	Height "C"
8" WB	402 602	100	65	100	75	24¼	9¼	13½
10" WB	603 604	200	130	200	150	27¼	10¾	16⅜
13" WB	606 608	550	365	550	400	34¾	13¼	20⅛
16" WB	610	1000	650	1000	750	38⅝	15½	22¾
19" WB	612 614	2000	1300	2000	1500	45¾	18½	26½
23" WB	616 618	4000	2600	4000	3000	55⅛	21⅞	31⅛



Bottom view of new "WB" Brake showing tubular connecting lever for lubricating bearings at both ends from one alemite-fitting. The brake can be mounted either right or left hand, and the lubrication may be applied from either side through an opening in the brake frame.

EC&M "WB" Brakes have long been known for their fast response in releasing and setting. The fundamental short-stroke characteristic of these new "WB" Brakes which gives quick action has been proved on crane-hoists and hard-worked mill applications. Unit pressure between brake shoe and wheel remains at substantially the same low value as in the previous WB Brakes. These new EC&M "WB" Brakes, built to the AISE-NEMA Standards, are designed to give smoother operation . . . safer stops . . . and less maintenance. Specify EC&M Bulletin 1000 Type WB Brakes.

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EC & M DIVISION • CLEVELAND 28, OHIO

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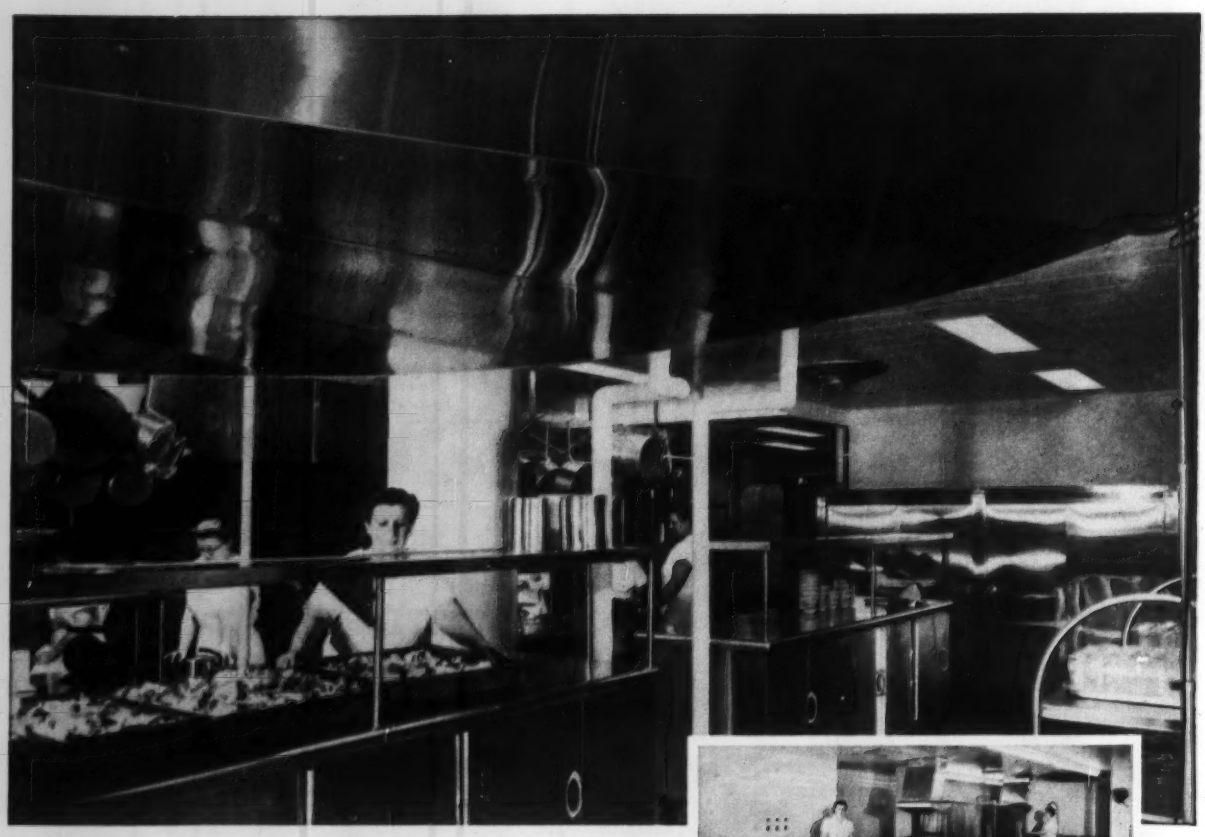

How to run a top quality kitchen

. . . *at rock-bottom cost!*

Write for your copy

"STAINLESS STEEL for STORE FRONTS and BUILDING ENTRANCES"

If modernization or new construction is on your mind, this 40-page booklet contains many ideas on handsome treatments for you. (Note: A new booklet on "AL Stainless in Food Preparation and Serving Equipment" is in process —write for one of the first copies when available.)

ADDRESS DEPT. S-811

Sure, you'll need a good chef and good management—but first of all, you'll need stainless steel equipment! That's where to start for the highest sanitary standards—the easiest, quickest cleaning and lowest-cost maintenance. And that's where to start for the greatest long-term economy, too—because stainless steel can't chip, crack, peel or wear off. It costs you much less than anything else in the long run because it literally lasts for a lifetime . . . stands up under the heaviest service and stays beautiful all the way. ● In the kitchen, in the dining-room (and for structural details, too) specify *stainless steel* . . . it pays! ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

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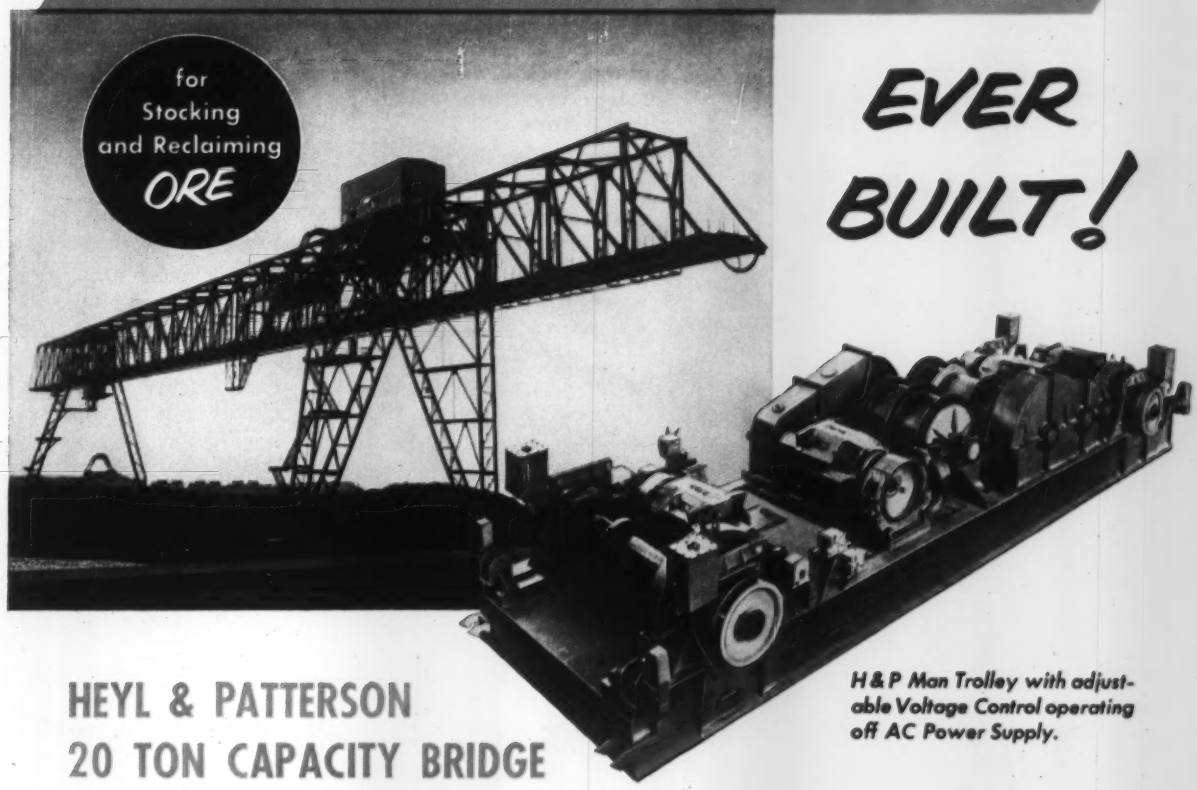
AL® ALLEGHENY LUDLUM

One of the most modern bridges...



EVER BUILT!

H & P Man Trolley with adjustable Voltage Control operating off AC Power Supply.

HEYL & PATTERSON 20 TON CAPACITY BRIDGE

Half-a-century of performance records prove that Heyl & Patterson Ore and Coal Bridges are designed, built and erected for dependable and long-lasting performance. Bridges similar to the one shown here for stocking and reclaiming ore, are designed in cooperation with the engineers of many Steel Companies, to function economically and safely with an important object in mind . . . reduction of structural, mechanical and electrical maintenance.

TAKE A GOOD LOOK AT THIS BRIDGE. Then ask a Heyl & Patterson Sales-Engineer to demonstrate how its many features can reduce to a minimum the cost of your operating budget.

H & P FEATURES WORTHY OF YOUR CONSIDERATION . . . Wide Flange Beam Construction to reduce rust corrosion . . . Adjustable Voltage Control for smooth trolley operation, for increased hoisting speed and reduction of trolley weight . . . Aluminum Contact Conductors . . . Fabreeka Mountings for shock absorption . . . Worm Gear Driven Trucks . . . Hydraulically Operated Automatic Rail Clamps . . . Trolley Buffers. These are some of the features justifying the headline . . . "One of the Most Modern Bridges Ever Built."

Heyl & Patterson
INC.

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NEW

PRECISION WAY to hob gears up to 23 ft. diameter

SCHIESS RF GEAR HOBBERS

Tremendous! Yes—and newly designed! Cut mammoth gears from 9 ft. to 23 ft. diameter with "lightweight" precision! Spur, helical and herringbone gears (including internal gears). Also wormwheels of either low- or high-lead angle.

Accurately centered fixed table supports blanks ranging from 20 to 80 tons. Moving column adjustable for both diameter of gear and depth of tooth. Cuts in either upward or downward direction. Huge master wormwheels assure accuracy of indexing movement. Tooth pressures of worms offset each other—no lateral stress.

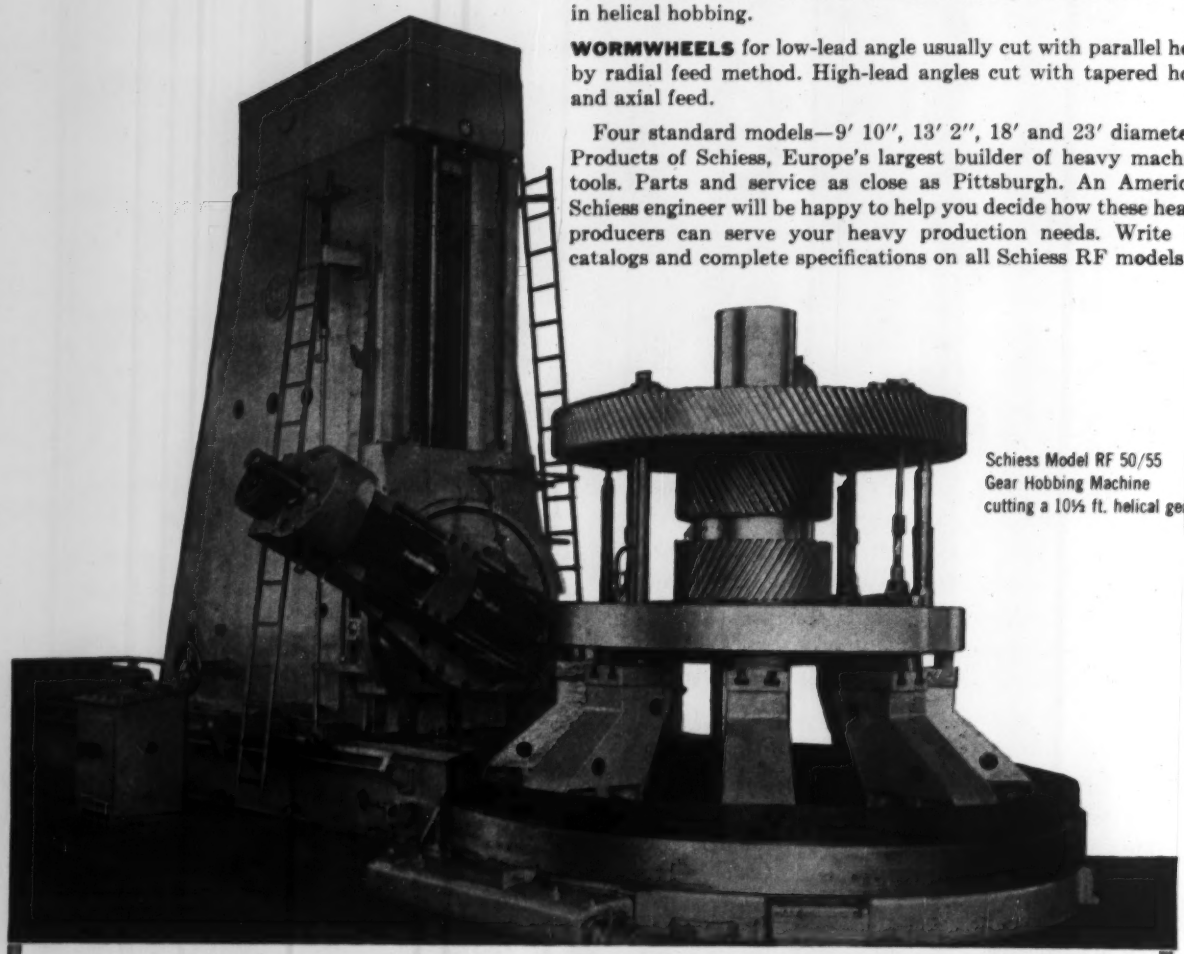
SPUR GEARS cut by driving work table through index change gears connecting with hob spindle drive.

SINGLE HELICALS (or double helicals with teeth separated by gap) produced by additional table movement—by means of differential gear provided with change gears.

HERRINGBONES cut with end mills by means of single indexing method. Additional table motion achieved by same method used in helical hobbing.

WORMWHEELS for low-lead angle usually cut with parallel hobs by radial feed method. High-lead angles cut with tapered hobs and axial feed.

Four standard models—9′ 10″, 13′ 2″, 18′ and 23′ diameters. Products of Schiess, Europe's largest builder of heavy machine tools. Parts and service as close as Pittsburgh. An American Schiess engineer will be happy to help you decide how these heavy producers can serve your heavy production needs. Write for catalogs and complete specifications on all Schiess RF models.



Schiess Model RF 50/55 Gear Hobbing Machine cutting a 10½ ft. helical gear.

engineering division

SCHIESS

AMERICAN SCHIESS CORPORATION

1232 Penn Avenue, Pittsburgh 22, Pa.

(Photo courtesy of Detroit Steel Corp.)

Ultra-Modern

Tapping a heat from one of four 250 ton open hearths designed and built by Loftus at Detroit Steel's Portsmouth Plant.

Loftus OPEN HEARTH DESIGN

Loftus has engineered and erected 81% of all the new open hearth capacity installed since 1938 by independent engineer-contractors. Behind these installations is "know-how" acquired and developed over the years by an organization which offers a "package" service to the entire steel industry. From drawing board to first tap, your problems will be solved by specialists with experience, explaining why "Loftus Builds 'em Better."

- **increases availability**
- **promotes lower cost operation**

Loftus Open Hearth design and construction combines proven experience with completely modern furnace concepts. It assures you of a better, more automatic furnace with less down time. Lower operating costs are more than just a possibility.

LOFTUS OPEN HEARTH DESIGN INCLUDES:

- Completely Automatic Reversal
- Full Sloping Back Wall Between Port Throats
- Water-cooled Doors with Archless Frames
- Water-cooled Front Buckstays
- Basic Suspended Ends Including the Port End Arches
- Flat Suspended Fantails and Regenerator Roofs
- Electronic Roof Temperature Controllers Automatically Regulate Fuel Flow
- Full Automatic Fuel-Air Ratio Control
- Front and Rear Slag Flush—Single or Double

WRITE TODAY FOR

An informative brochure on Loftus Design

Loftus ENGINEERING CORPORATION

Designers and Builders of Industrial Furnaces

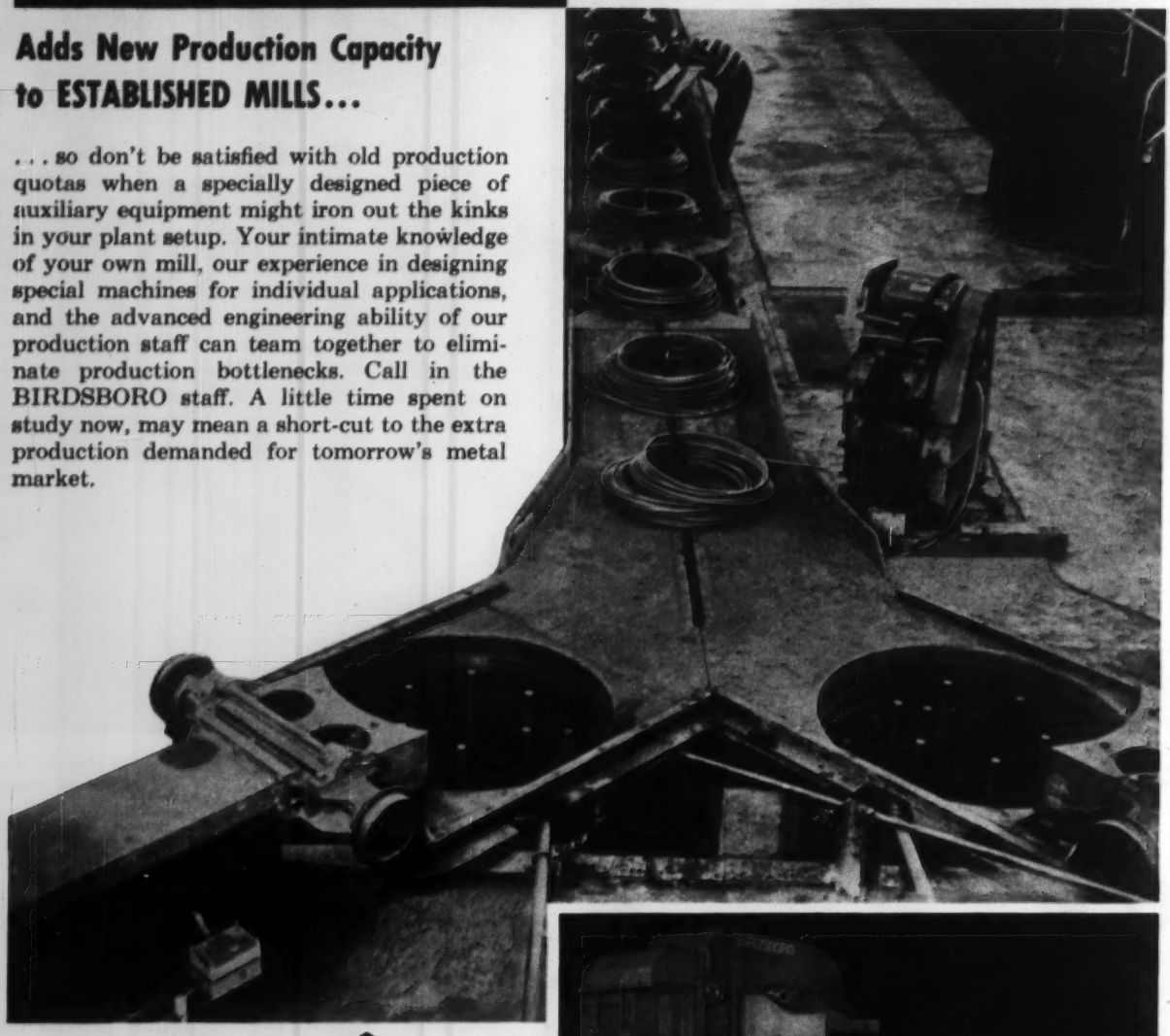
610 Smithfield Street, Pittsburgh 22, Pennsylvania

54-23-12

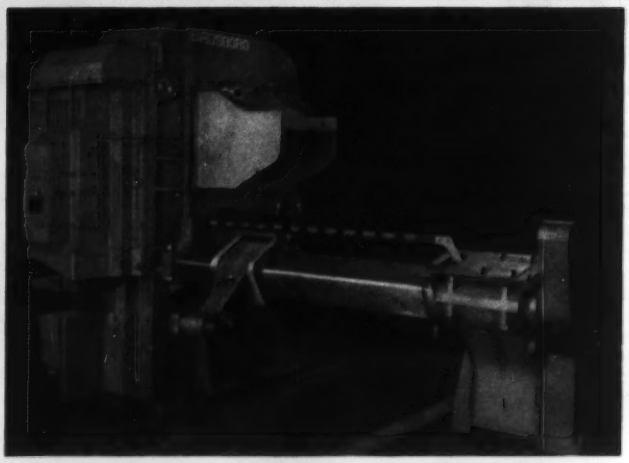
BIRDSBORO Auxiliary Mill Equipment

Adds New Production Capacity to ESTABLISHED MILLS...

. . . so don't be satisfied with old production quotas when a specially designed piece of auxiliary equipment might iron out the kinks in your plant setup. Your intimate knowledge of your own mill, our experience in designing special machines for individual applications, and the advanced engineering ability of our production staff can team together to eliminate production bottlenecks. Call in the BIRDSBORO staff. A little time spent on study now, may mean a short-cut to the extra production demanded for tomorrow's metal market.



20"-18"-14"-12"-10" Combination Mill Rod Coilers and Rod Coil Conveyor.



This 350-ton Birdsboro Up and Down Cut Shear and Gauge is used for hot shearing of 8" x 8" carbon steel blooms.

DESIGNERS AND BUILDERS OF

- STEEL MILL MACHINERY
- HYDRAULIC PRESSES (Metalworking and Extrusion)
- CRUSHING MACHINERY
- SPECIAL MACHINERY
- STEEL CASTINGS
- Weldments "CAST-WELD" Design
- ROLLS: Steel, Alloy Iron, Alloy Steel

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

New York Office: **Engineering Supervision Co.,** *120 West 42nd Street, New York 36, N.Y.*

CALENDAR
OF MEETINGS

Sept. 17-21, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Sept. 17-21, Instrument Society of America: Annual instrument-automation conference and exhibit, Coliseum, New York. Society's address: 1319 Allegheny Ave., Pittsburgh 33, Pa. Executive director: William H. Kushnick.

Sept. 20-21, American Hot Dip Galvanizers Association: Semiannual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Sept. 21, Malleable Founders' Society: Fall meeting, Hotel Cleveland, Cleveland. Society's address: Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.

Sept. 24-25, Steel Founders' Society of America: Fall meeting, Greenbrier, White Sulphur Springs, W. Va. Society's address: 606 Terminal Tower, Cleveland 13, O. Executive vice president: F. Kermit Donaldson.

Sept. 24-28, Trade Fair of the Atomic Industry: Navy Pier, Chicago. Information: Trade Fair Department, Atomic Industrial Forum, 260 Madison Ave., New York 16, N. Y.

Sept. 25-28, Association of Iron & Steel Engineers: Annual meeting and exhibit, Public Auditorium, Cleveland. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 27-28, Radio-Electronics-Television Manufacturers Association: Fall meeting, Homestead, Hot Springs, Va. Association's address: 777 14th St. N.W., Washington 5, D. C. Secretary: James D. Secrest.

Sept. 27-29, National Association of Foremen: Annual meeting, Jefferson hotel, St. Louis. Association's address: 321 W. First St., Dayton 2, O. Secretary: Mrs. Jean B. Adams.

Sept. 30-Oct. 4, Electrochemical Society Inc.: Fall meeting, Statler hotel, Cleveland. Society's address: 216 W. 102nd St., New York 25, N. Y. Secretary: Henry B. Linford.

Oct. 1-3, National Electronics Conference Inc.: Annual meeting and exhibit, Sherman hotel, Chicago. Conference's address: 84 E. Randolph St., Chicago 1, Ill. Executive secretary: John S. Powers.

Oct. 1-4, American Mining Congress: Metal mining and industrial minerals convention and exposition, Shrine Auditorium and Exposition Hall, Los Angeles. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president and secretary: Julian D. Conover.

Oct. 1-5, American Institute of Electrical Engineers: Fall general meeting, Morrison hotel, Chicago. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

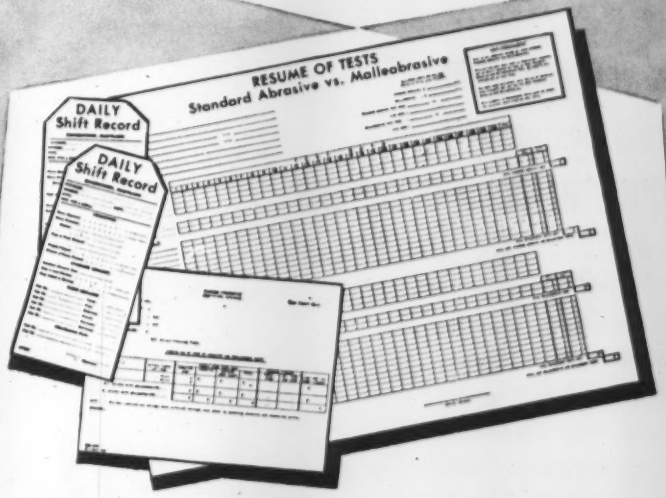
Oct. 2-4, Air Moving & Conditioning Association Inc.: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Association's address: 2159 Guardian Bldg., Detroit 26, Mich. Executive vice president: L. O. Monroe.

Oct. 2-6, Society of Automotive Engineers Inc.: National aeronautic meeting, aircraft production forum and aircraft engineering display, Hotel Statler, Los Angeles, Calif. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Oct. 4-5, Magnesium Association: Annual meeting, Drake hotel, Chicago. Association's address: 122 E. 42nd St., New York 17, N. Y. Secretary: Jerry Singleton.

MALLEABRASIVE®

PUT THE "test" IN testing!



The only real test of any abrasive is its cost per ton of castings —obtained only by completely recorded use in production.

Malleabrasive was the first metal abrasive to be sold on the basis of recorded production performance in user's plants. The fact is, in its early stages of limited production, we sold it **only** to those who would agree to run recorded comparative tests. Yes, Malleabrasive really "put the test in testing" — really started all of this testing business!

Malleabrasive's economy has since been proven in hundreds of plants, so there are no restrictions on its sale any more. But— we do say, if extravagant claims and gimmick-guarantees are offered you that some other abrasives are cheaper for you than Malleabrasive, the only way to get the facts is to run recorded tests of both materials. Don't depend on generalities.

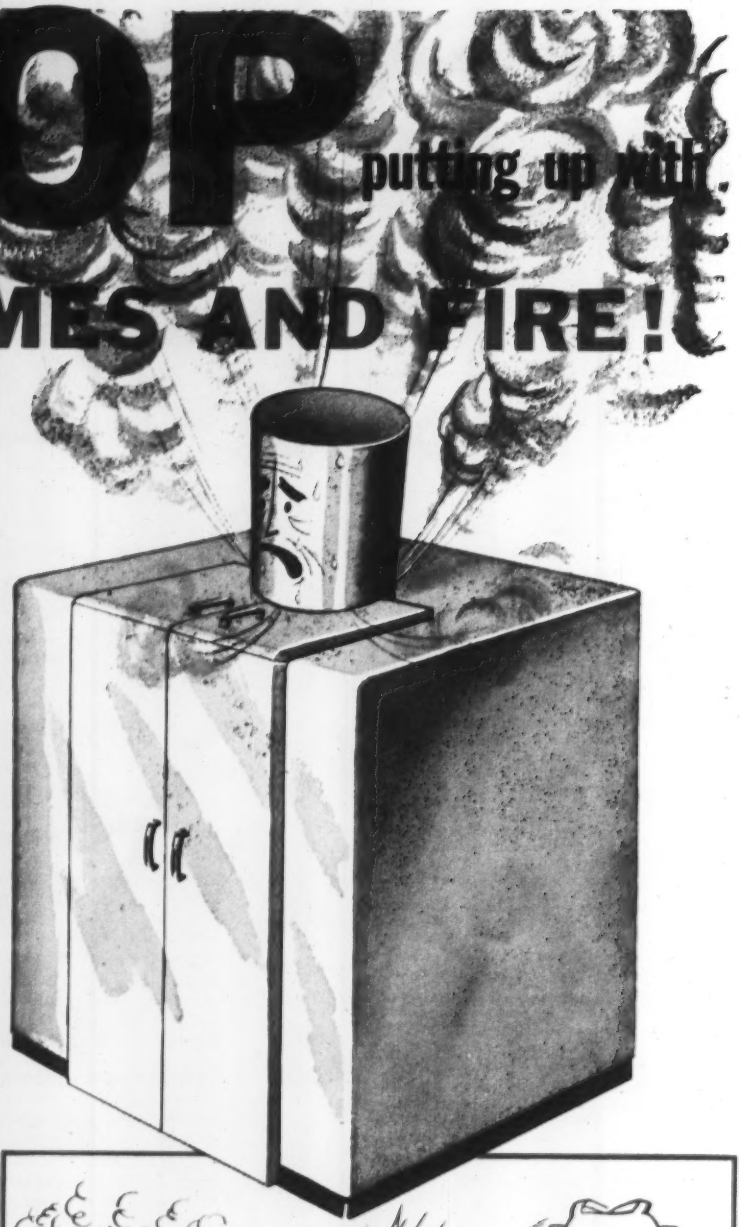
Samples of the test record forms used to establish Malleabrasive's economy will be sent on request. Write us.

THE GLOBE
STEEL ABRASIVE COMPANY
MANSFIELD, OHIO

Sold and recommended by Pangborn Corp., Hagerstown, Md.

NOW IN EASY TO HANDLE
50-POUND DOUBLE BURLAP BAGS"

STOP putting up with HEAT, FUMES AND FIRE!



Now you can clean metals better with HOUGHTON COLD CLEANERS

Houghton's new COLD CLEANERS make hot, steamy, dangerous metal cleaning processes obsolete for many shop jobs.

These new cleaners, used at room temperature in both power washers and dip tanks, readily remove processing oils, pigmented drawing compounds, rust preventive coatings. Cold cleaners do away with costly, uncomfortable heating of cleaning compounds. They eliminate the fire hazards and toxicity of low flash point solvents . . . and they do a faster, better cleaning job at low cost!

Get the full story on the cleaning effectiveness of COLD CLEANERS from the Houghton Man, or write direct to E. F. Houghton & Co., 303 West Lehigh Ave., Phila. 33, Pa.

THE HOUGHTO-CLEAN LINE

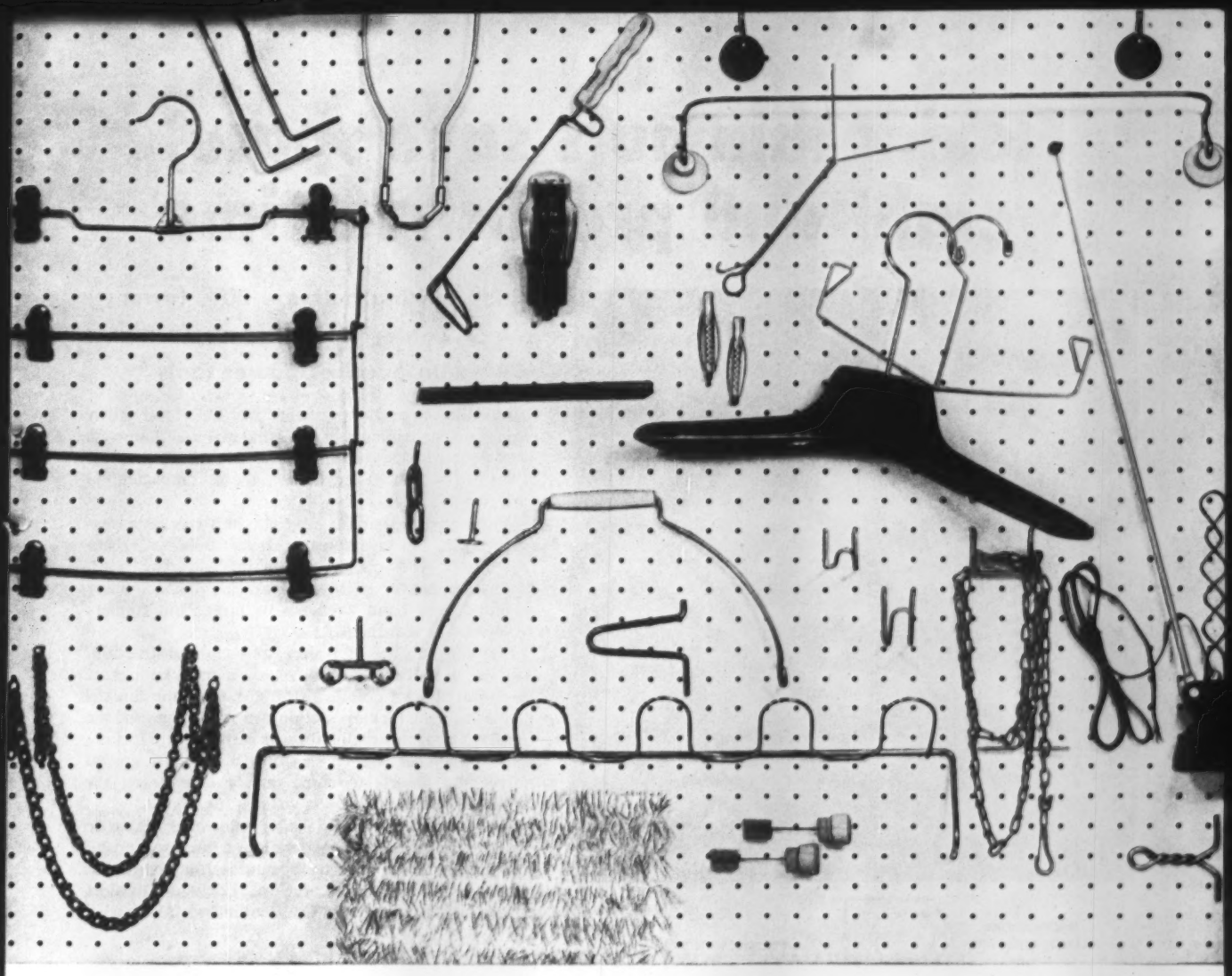
Emulsion, Acid, Alkaline and Detergent-type Cleaners for every industrial need

. . . products of

E F HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .



How these products were improved and costs lowered . . . with **NICKELPLY*, BRASSPLY*** and **COPPERPLY*** wire!

● National-Standard Nickelply, Brassply and Copperply is electro-jacketed steel wire—a new development offering important advantages to manufacturers and users of wire forms and components. Specifically . . . . .

The jacket metal, precisely concentric and to the required thickness, *is inseparably bonded to the steel wire.* The materials can be severely formed, twisted, swaged, welded, roll threaded or redrawn without fracturing the jacket metal or otherwise exposing the base metal. Thus these new materials can often replace solid nickel, brass or copper wire, or can eliminate the costly post-plating of steel wire forms . . . and with unmatched assurance of coating coverage! Advantages in strength, durability and economy are obvious.

Nickelply, Brassply and Copperply are now available commercially in diameters up to .340". Pertinent data on coating weights, strengths, finishes, base materials, corrosion resistance, etc., are given in Bulletin K-10. Why not send for it now and explore these new possibilities?

*Trade Mark National-Standard Company

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

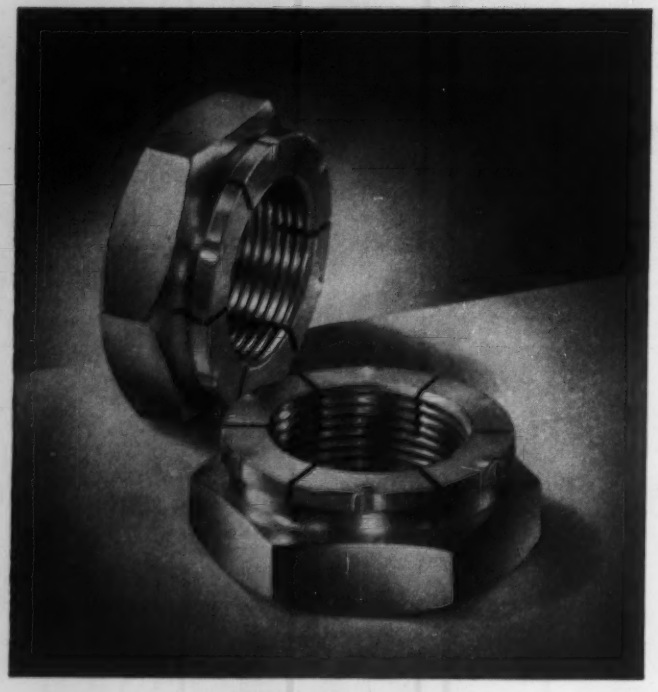
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS NATIONAL-STANDARD Company NILES, MICHIGAN

WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

Flexloc thin nuts save space, weight and production time



Self-locking nuts are 30% lower and lighter; speed up assembly with hand or power tools

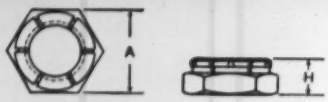
Self-locking FLEXLOC thin nuts are 30% lower than regular height locknuts of the same nominal diameter. They fit into spaces where regular height locknuts will not go. You can design lighter, more compact units with them.

Where you must reduce weight in a completed assembly, you can save by using shorter bolts with these lighter nuts. And you save production time. The length of engagement of mating threads is shorter: fewer revolutions of hand wrenches or power nut runners are needed to seat them.

FLEXLOC nuts are of 1-piece, all-metal construction. You can use a FLEXLOC fully seated as a locknut or at any point along a bolt as a stop nut. Once the threads in the resilient locking section are fully engaged, the FLEXLOC grips the mating threads with uniform locking torque wherever wrenching stops. Since there are no nonmetallic inserts to come out or deteriorate, the locking life of a FLEXLOC is virtually unlimited.

Your authorized industrial distributor stocks FLEXLOC nuts in a variety of sizes, materials and finishes. Consult him for details. Or write us for information about your special locknut problem. Flexloc Locknut Division, STANDARD PRESSED STEEL Co., Jenkintown 33, Pa.

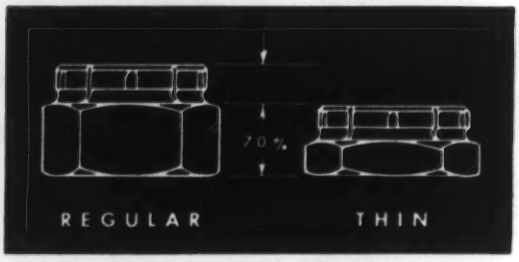
SPECIFICATIONS
FLEXLOC THIN NUTS



NATIONAL COARSE THREAD—U.S.S

SIZE	A INCHES	H INCHES	WIDTH ACROSS CORNERS	WEIGHT PER 1000 NUTS
6-32	.312	.125	.361	1.8
8-32	.344	.172	.397	2.8
10-24	.375	.172	.433	3.3
¼-20	.438	.203	.505	5.4
5/16-18	.563	.250	.649	11.6
⅜-16	.625	.265	.722	14.9
7/16-14	.750	.312	.866	24.9
½-13	.813	.312	.938	28.4
9/16-12	.875	.359	1.010	36.1
⅝-11	1.000	.391	1.155	54.1
¾-10	1.125	.406	1.299	69.2
⅞-9	1.312	.469	1.516	107.5
1-8	1.500	.563	1.732	171.6
NATIONAL FINE THREAD—S.A.E.				
6-40	.312	.125	.361	1.8
8-36	.344	.172	.397	2.8
10-32	.375	.172	.433	3.3
¼-28	.438	.203	.505	5.4
5/16-24	.500	.250	.577	8.7
⅜-24	.563	.266	.649	11.5
7/16-20	.625	.312	.722	14.9
½-20	.750	.312	.866	21.7
9/16-18	.875	.359	1.010	36.2
⅝-18	.938	.391	1.082	42.4
⅜-16	1.063	.406	1.227	54.5
⅞-14	1.250	.469	1.443	84.6
1-14	1.438	.563	1.660	136.3
1 1/16-12*	1.625	.625	1.876	193.5
1 ¼-12*	1.813	.750	2.093	296.0
1 3/16-12*	2.000	.812	2.309	389.0
1 ½-12*	2.187	.875	2.526	498.0

*Steel only (plain or cadmium plated) in stock sizes.



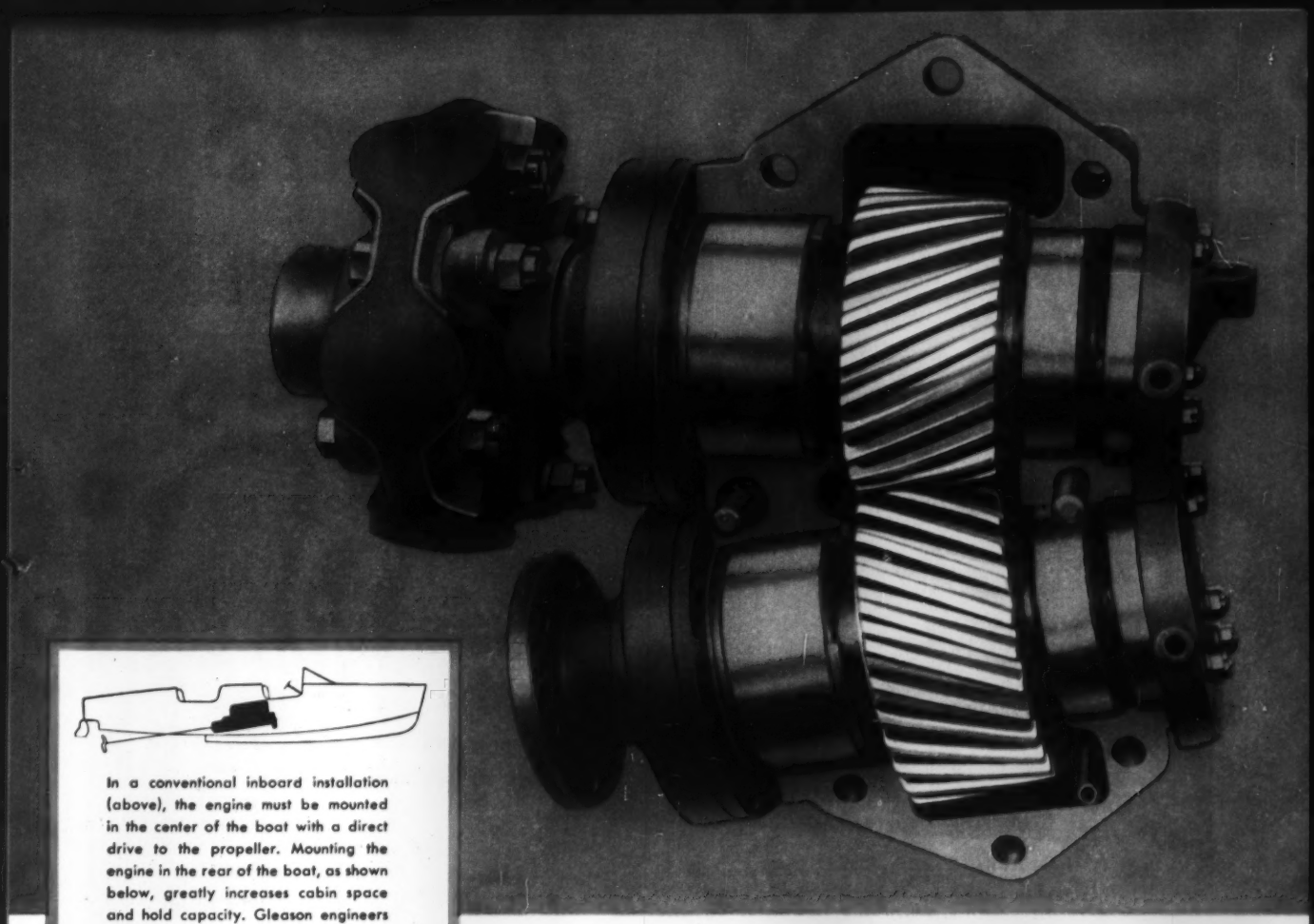
FLEXLOC thin nuts are 30% lower than regular height locknuts. There is a corresponding saving in weight. In sizes through 5/16 in., thin FLEXLOCs meet tensile strength requirements for regular height locknuts. FLEXLOC nuts can be made in the thin type because every thread, even those in the locking section, carries its full share of the load. There are no nonmetallic inserts to waste head space or weaken the structure of the nut.

Standard FLEXLOC self-locking thin nuts are available in plain or cadmium plated alloy steel, for use in temperatures to 550°F; in plain or silver plated corrosion resisting steel, for temperatures to 750°F; and in brass and aluminum, for temperatures to 250°F.

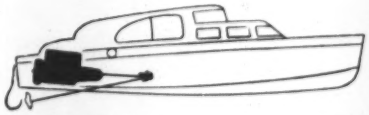
STANDARD PRESSED STEEL CO.

FLEXLOC LOCKNUT DIVISION SPS

JENKINTOWN PENNSYLVANIA



In a conventional inboard installation (above), the engine must be mounted in the center of the boat with a direct drive to the propeller. Mounting the engine in the rear of the boat, as shown below, greatly increases cabin space and hold capacity. Gleason engineers assisted the Marine Engine Manufacturers in the development of the V-Drive.



Angular power transmission can improve *your* product, too

Take, for example, this marine V-Drive. The use of spiral bevel gears permitted a design which released more usable space in the boat, improved balance, and simplified installation.

This is just one instance of the added flexibility of product design possible with angular power transmission.

Faster production and lower costs will also result from using this type of transmission.

If you have a design application for bevel or hypoid gears, the Gear Engineering Department of the Gleason Works is ready to help you realize every advantage possible. Design and production recommendations for your angular drive are offered at no obligation.

If you would like to discuss your bevel gear application with a Gleason representative, please contact us.

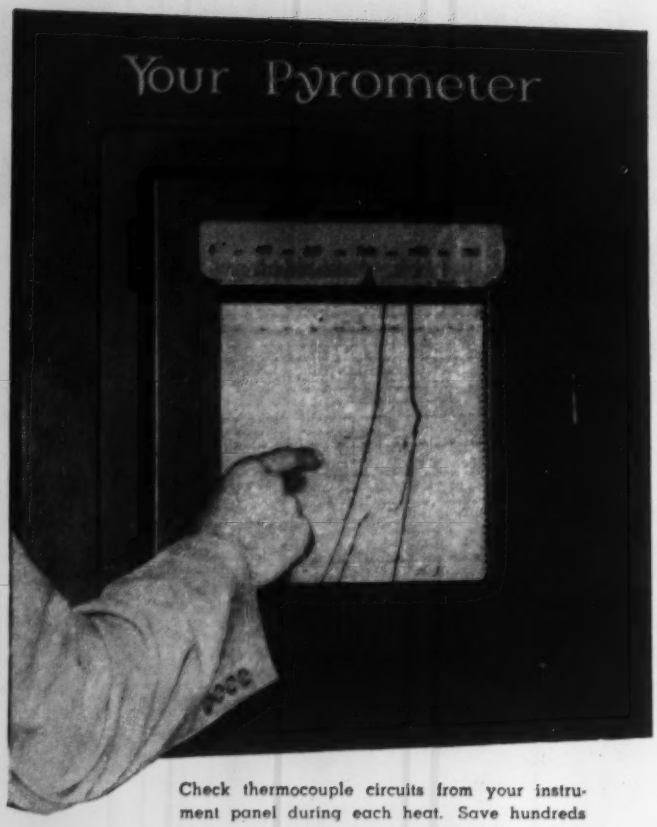
These Gleason Technical Handbooks are available on request:

Spiral Bevel Gear System
20° Straight Bevel Gear System
Zerol® Bevel Gear System

GLEASON WORKS

Builders of bevel gear machinery for over 90 years

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.



Check thermocouple circuits from your instrument panel during each heat. Save hundreds of hours inspecting and needlessly replacing thermocouples.

THERMOCOUPLE CIRCUIT RESTORER

CUTS INSPECTION and REPLACEMENT COSTS

*THE RESTORER detects and corrects thermocouple circuit failure during any heat treating or melting operation.

**THE LEAK-CHECKER detects leaks in thermocouple protection tubes immersed in saltbath or other melting furnaces.

Write for Catalog R-26

Electronics Division

THE Peerless-Electric® COMPANY

1453 W. MARKET ST. · WARREN, OHIO

FANS · BLOWERS · MOTORS

ELECTRONIC EQUIPMENT

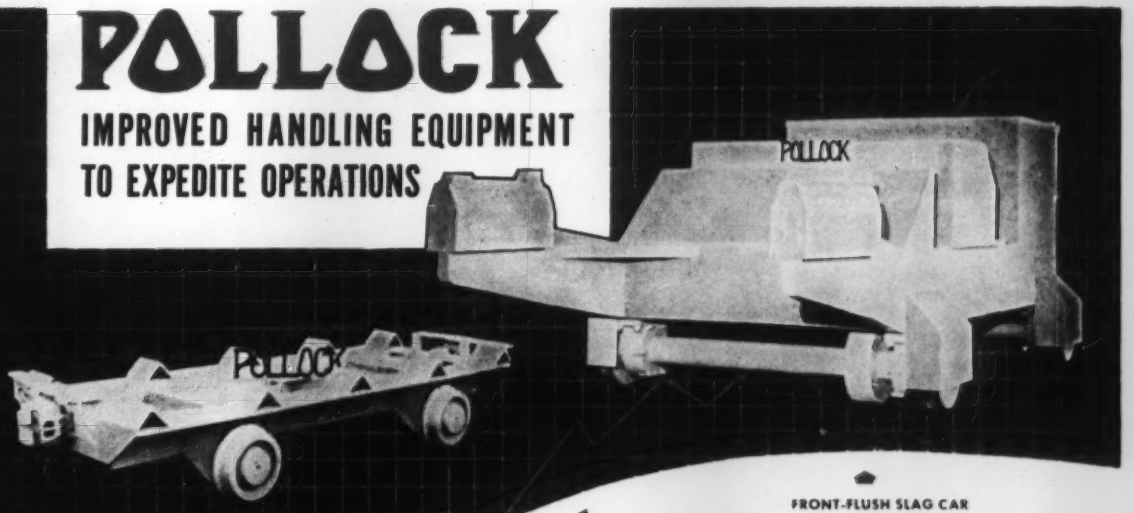
Since 1893

Listed below are some purchasers of the Restorer* and Leak-Checker.**

BELL ANNEALING FURNACE	*Allegheny Ludlum Steel Corp.* *Rome Strip Steel Co., Inc.* *Sharon Steel Corp.*
BOX ANNEALING FURNACE	*American Chain Division American Chain & Cable Co., Inc.* *Frazer & Jones Co.*
CONTINUOUS ANNEALING FURNACE	*Damascus Tube Co.* *Washington Steel Corp.*
SALTBATH	*Aircraft-Marine Products, Inc.* *The Black & Decker Mfg. Co.* *The Electric Auto-Lite Co.*
OTHERS	*Battelle Memorial Institute* *Davison Chemical Company Div. of W. R. Grace & Co.* *Farrel-Birmingham Company, Inc.* *Ferriot Brothers, Inc.* *Johnson Bronze Co.* *U. S. Atomic Energy Commission* *United States Steel Corporation*

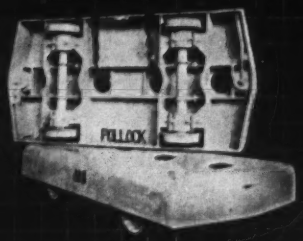
POLLOCK

IMPROVED HANDLING EQUIPMENT TO EXPEDITE OPERATIONS



FRONT-FLUSH SLAG CAR

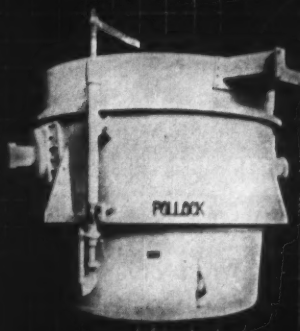
CHARGING BOX CAR



INGOT CAR

an important factor in increased open hearth production

OPEN HEARTH LADLE

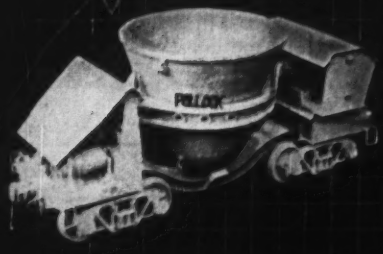


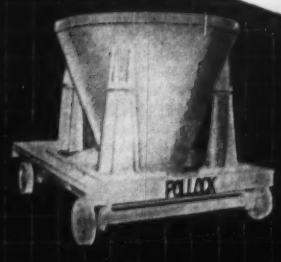
• Pollock experience in the development and construction of open hearth equipment assures smooth flow of operations. To measure use-value of Pollock handling equipment, add their day by day engineering research to 85 years of producing for the steel industry. General specifications available on request. Special-performance details engineered for your needs.

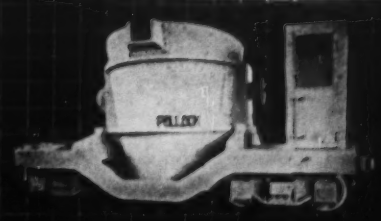
SLAG CAR

DRAG-OUT SLAG CAR

HOT METAL TRANSFER CAR







POLLOCK
SINCE 1863

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN · OHIO
STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · CASTINGS

BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

ALUMINUM MELTING AND DIE CASTING INTEGRATED....

with the duplex AJAXOMATIC®

With the touch of a button the operator releases the complete automatic cycle: die closing, Ajaxomatic pour, shot, cooling, die opening, ejection.

Simultaneously, the Duplex *Ajaxomatic* melts batches of scrap and pig. Weight, time and temperature of each automatic pour are closely controlled.

RESULTS:

Higher production rate — No molten metal handling

Uniform casting quality — No operator fatigue

PRODUCTION: Up to 500 pounds per hour (Special units available for higher ratings) CASTING SIZE: ½ pound to 20 pounds

VISIT BOOTH 1609 METAL SHOW CLEVELAND Oct. 8-12

MAY WE STUDY YOUR REQUIREMENTS?

AJAX TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

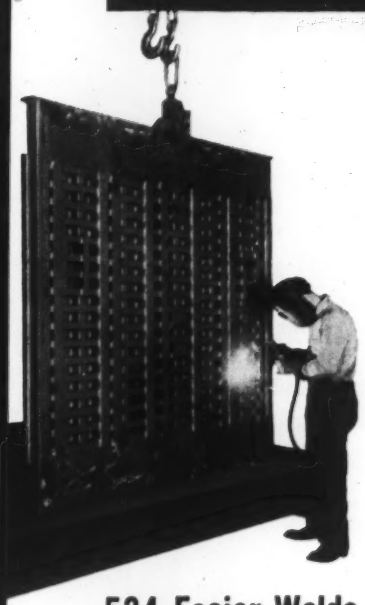
AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

® Reg. U. S. Patent Office

HOW USS "T-1" STEEL IMPROVES THESE PRODUCTS...

. . . Lops Off 1,047 Lbs.

Trays for ore clean-up buckets need tremendous resistance to impact, abuse, and abrasion. Blaw-Knox Company, Pittsburgh, Pa., found that they weigh half a ton less, and cost less to fabricate when made from USS "T-1" Steel plate instead of heavy steel castings.



. . . 534 Easier Welds

This printing press bedplate manufactured by Graver Tank & Manufacturing Co., Inc., must be welded in 534 places. High alloy steel with the needed strength was very difficult to weld. But USS "T-1" Steel is easy to weld . . . and has the needed strength to keep these bedplates, used on high-speed printing presses, as lightweight as possible.

Three Ways Better . . .

International Nickel Company of Canada expects USS "T-1" Steel to increase the service life, to reduce the maintenance, and lower the long-term cost of ore cars like this one; because "T-1" Steel has far greater strength, toughness, and resistance to abrasion than steel used previously. The car builder, Canadian Car and Foundry Co., Ltd., has had no difficulty fabricating this very strong alloy steel.

HOW USS "T-1" STEEL CAN HELP YOU

The great strength and toughness of USS "T-1" Steel (90,000 psi, minimum yield strength) helps you to increase the capacity and durability of power-shovel buckets and storage tanks without increasing weight.

Its excellent weldability enables you to fabricate large equipment out in the field without heat treatment. It thus reduces fabricating and shipping costs and speeds up construction.

Its unusual toughness at sub-zero temperatures improves service life of equipment that must take impact, abrasion, and abuse in all weather.

USS "T-1" Steel also gives you good creep-rupture strength to 900°F. It often can be substituted for more expensive steels that are more difficult to fabricate. There is a place for "T-1" Steel somewhere in your designs. Write, wire, or phone for complete information. United States Steel, Room 5534, Pittsburgh 30, Pa.

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USS "T-1" CONSTRUCTIONAL ALLOY STEEL

USS

See The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

UNITED STATES STEEL

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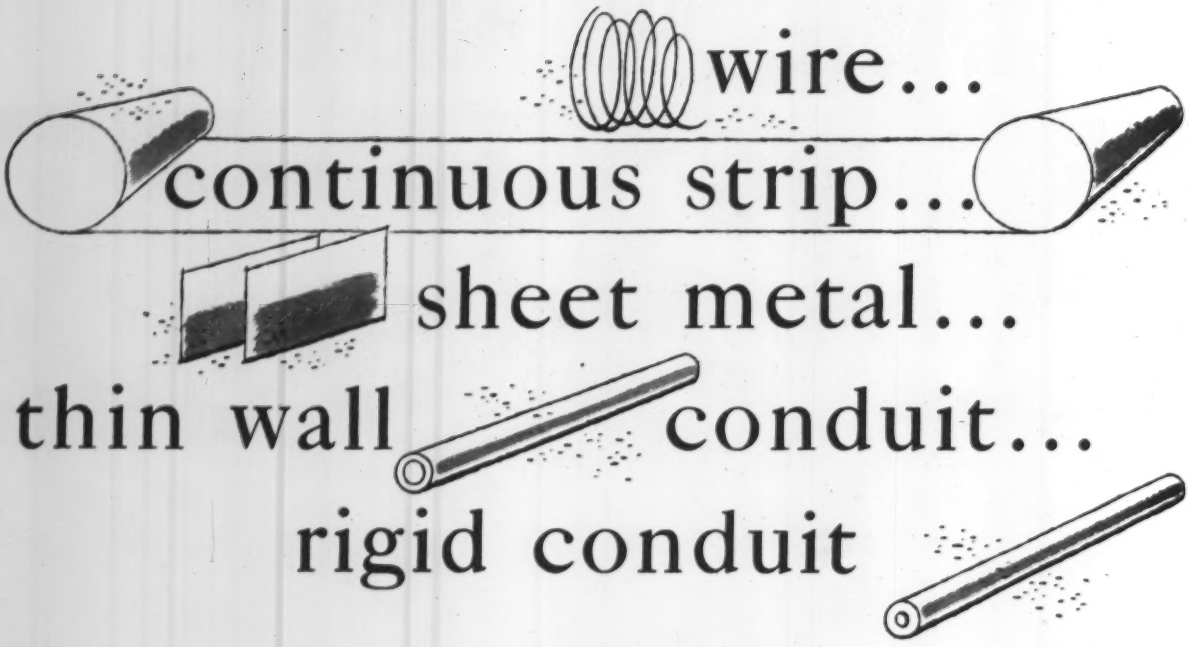

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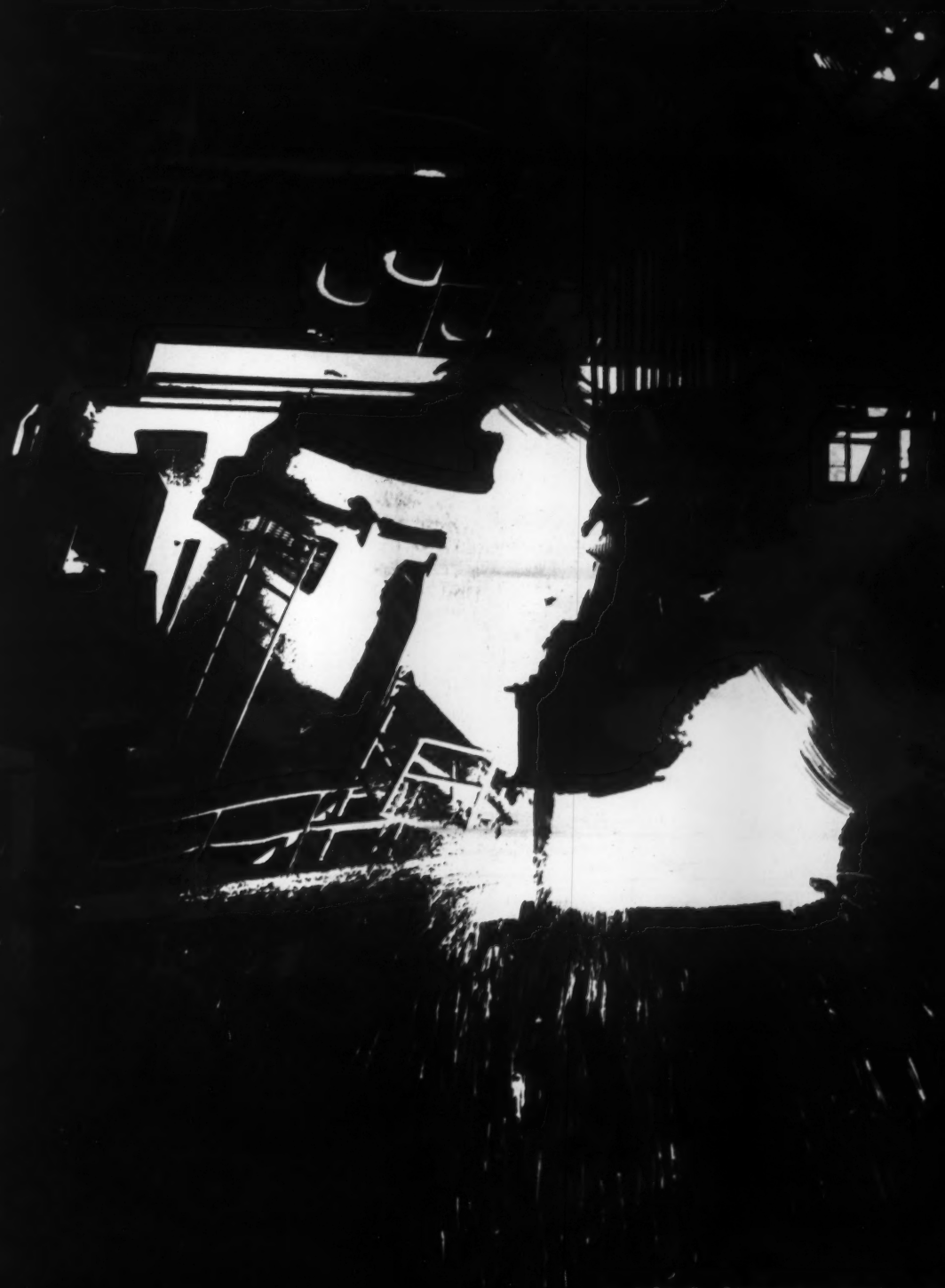

A COLD-CHARGE SHOP MOVES AHEAD

A COLD-CHARGE SHOP MOVES AHEAD

. . . with the electric arc furnace!

By R. S. Lynch, President
Atlantic Steel Company, Atlanta, Georgia

■Any growing company must periodically make basic decisions concerning expansions of capacity, weighing carefully all the factors involved to insure continued growth and profitable operation.

Atlantic Steel, an all open hearth shop for 50 years, has increased melting capacity several times during that period. Again faced with the need for major expansion in 1951, the logical question was — further increase of open hearth capacity or installation of electric arc furnaces?

Through the years, as the chart on the facing page indicates, we had taken one step after another to increase the ingot capacity and efficiency of our open hearth facilities. In the postwar period, it became evident that we were approaching the limit of such measures and that a new capital investment was necessary. The decision we made was to invest in electric arc furnaces.

Several years of successful experience with our first 75-ton unit then dictated the installation of a second furnace.

Consequently, we now have acquired an ample basis for direct comparison of the electric against the open hearth on cold-melt, low carbon steel operations — making the same grades of steel, with the same personnel, and using the same raw material sources. The results of our experience show that our original decision was wise. The major advantages we have realized are:

LOWER FIRST COST. Our entire investment in the electric melt shop has been about 40% less than it would have cost to put in the equivalent open hearth capacity.

SAVINGS IN SPACE. Since our ground space is limited here in Atlanta, we appreciated the fact that the new melt shop, providing room for a total of three electric furnaces, takes up a third less space than would new open hearths producing the same tonnage.

FAST CONSTRUCTION. Each of our management decisions has been quickly transformed into new melting capacity. Because of the compactness, pre-fabrication and simplicity, an electric shop can usually be built more rapidly than an open-hearth shop of like capacity.

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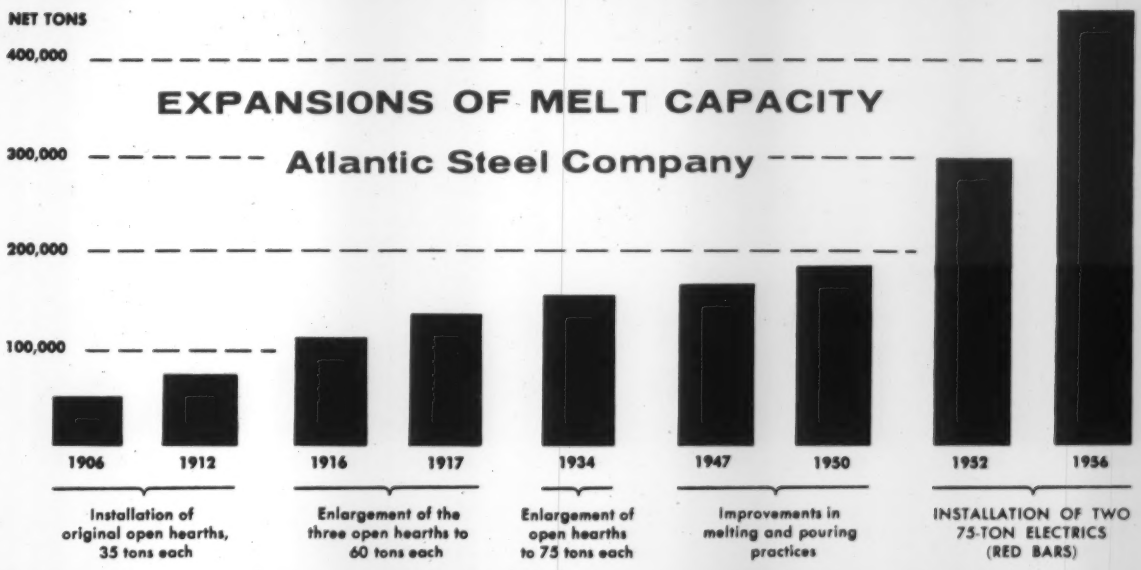

QUALITY CONTROL. Because our end-products require a wide range of carbon steel analyses, the electric furnace is particularly suited to our operation. Features important to us are precise temperature control and the absence of contamination from fuels.

FASTER HEATS. The four-hour heats of the electric furnace are a real boon to a custom shop such as ours. With adequate transformer capacity, we find that the only effective limitation on the heat input is the rate at which the scrap can absorb the heat.

FLEXIBLE OPERATIONS. We can produce electric steel according to demand – running the arc furnaces any number of shifts and any number of days per week. They start up quickly and shut down even more quickly, requiring the operator's attention only when producing steel.

LOWER OPERATING COSTS. Within six months after our first electric furnace was installed in 1952, it was producing steel at a lower net cost per ton than our open hearths which were working on the same grades. After the second furnace went into operation last fall, the economic advantage of the electric shop increased still more because of the reduction in its "cost above".

It should be emphasized that our shop produces no analyses outside of the low-carbon range – none of the high-priced alloy or stainless steels for which the electric furnace is usually required – yet we find that the arc has consistently reduced our costs and improved the efficiency of our operations.

We estimate that electric melting has reduced our ingot costs an average of 5%, compared to open hearth costs. Naturally, this figure varies somewhat with the cost of various raw materials. The cost advantage would also be different for other regions and end-products, but industry studies indicate that other non-integrated producers can also expect a substantial reduction of ingot costs with conversion to the electric furnace.

While on the cost factors, it is important to note that our power rates of 9-10 mills are neither high nor low as such rates go. Also, we have held our mold costs at about the same level as with the previous open hearth operation, by taking readings with immersion thermocouples to insure that electric furnace heats are not poured at excessive temperatures. And, we find that the electric furnace has reduced our costs for preparation of the scrap.

The flexibility and versatility of the electric shop are important operating factors to us because of the wide variety of our products. Since our founding, in 1901, to make cotton bale ties and turpentine barrel hoops, the list of products sold

under our trade-mark of "Dixisteel" has been steadily widened to include a complete line of merchant bars, reinforcing bars, fencing, nails, wire, small shapes and many other items. Hence the unusually wide variety of steel analyses — ranging from 5 to 40 points of carbon — and the extreme emphasis on flexibility in the Atlantic melt shop.

Some details of our electric shop experience may be of interest. We made the complete change-over with our regular open-hearth crews, excepting only an electric furnace melter hired from outside the company. Our personnel soon became skilled on the new furnaces and the training problems were minor, considering the scope of the change.

A most dramatic feature, of course, is the melting speed. The average heat cycle in our electric shop is four hours, but a good many heats approach the shop record of 2 hours and 45 minutes from charge to tap. The best heat we ever achieved with the open hearth was 7 hours, and our average was 8 hours. The slow charging operations on these open hearths made a painful contrast with the speedy top charging of our electrics. Our average output with open hearths ran about 8.5 tons per hour, but our electrics are running at almost twice that tonnage.

Another feature of the arc furnace which we find quite important is the ability to switch from single slag to double slag methods at will.

Our experience is 95% availability with the electrics where it was 90% with the open hearths.

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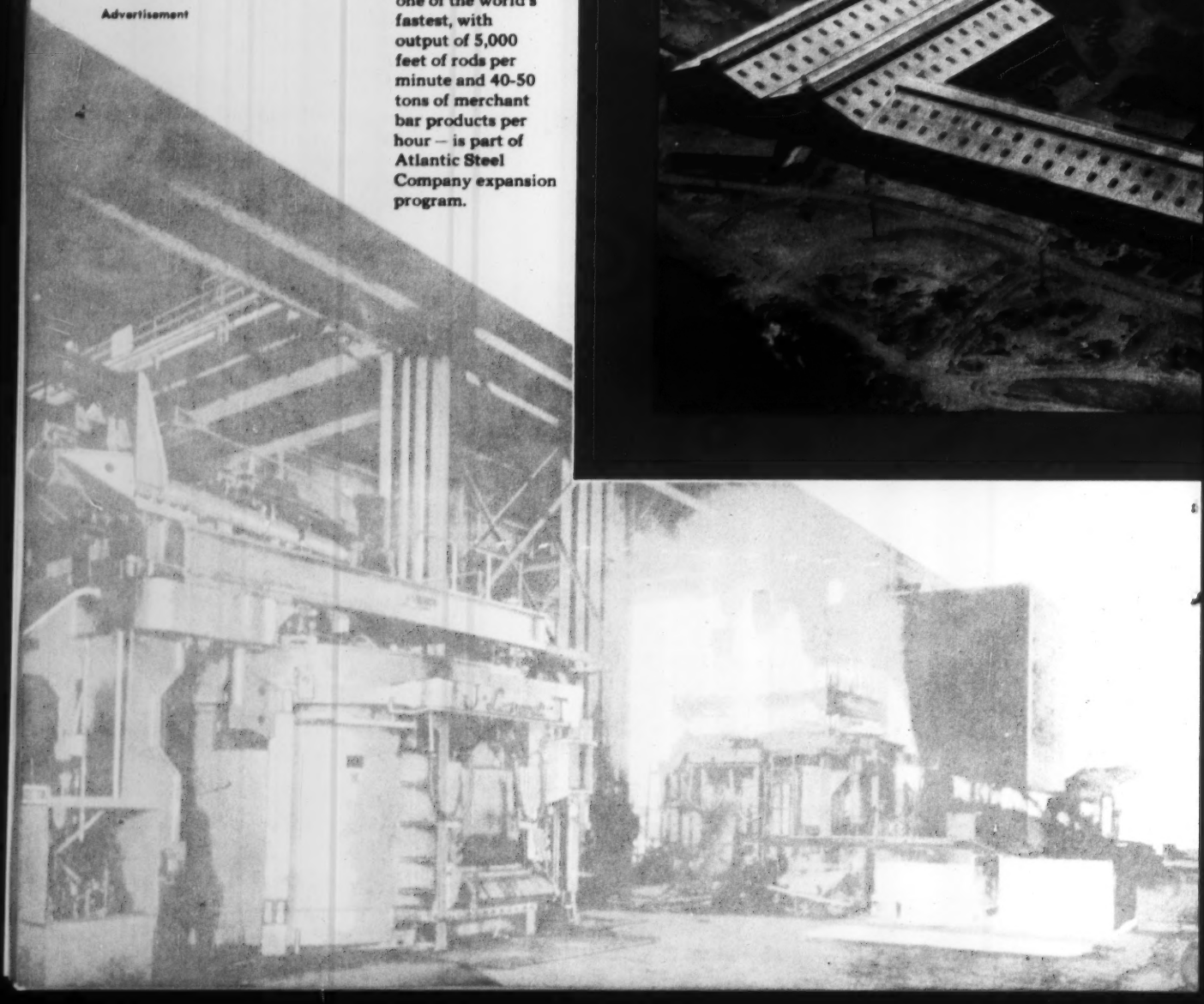
New $8½ million combination rod and bar mill — one of the world's fastest, with output of 5,000 feet of rods per minute and 40-50 tons of merchant bar products per hour — is part of Atlantic Steel Company expansion program.

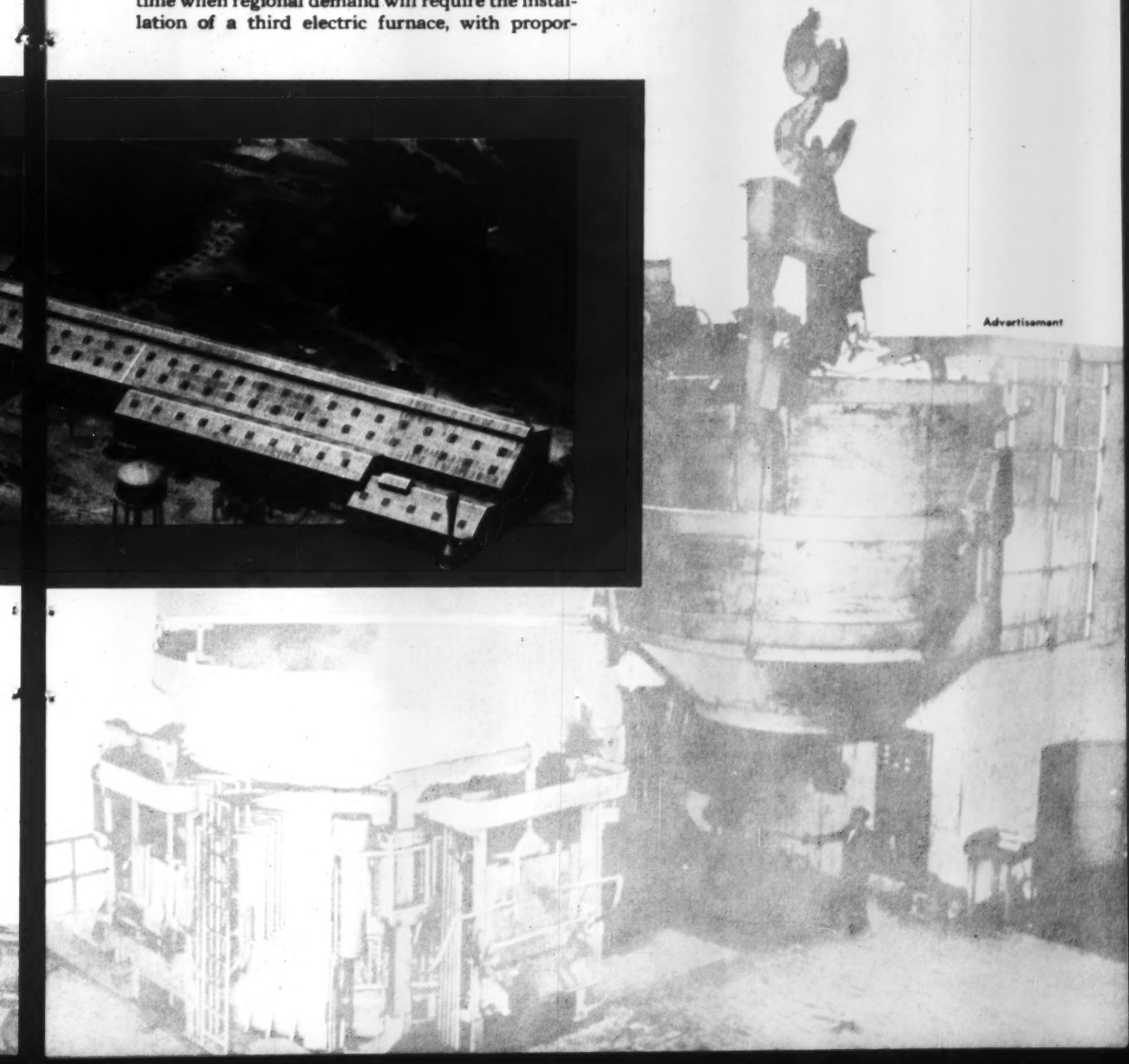


Some reasons for the difference are obvious. A spare roof can be put in place in three hours. Complete relining, except for the furnace bottom, requires only 12 hours. As you might expect, our maintenance costs have been cut by more than 50%. Furthermore, it was our experience with open hearths that production began to drop off sharply toward the end of each furnace lining campaign, whereas the electric furnace maintains the high level of output throughout the life of a lining.

We see a great future for the electric arc melting of low-carbon "work-horse" grades of steel in bulk tonnages. And we look forward to the time when regional demand will require the installation of a third electric furnace, with proportionate expansion of other facilities.

Actually, such a time should not be so far away. We look forward to continued growth with plenty of competition to keep us on our toes and the electric melt shop to help us meet it on an equal basis.

To sum up the way we feel about our decision to install an electric melt shop, let me quote an experienced open hearth man who has gone through the entire change-over with us. J. E. Wilbanks, our Superintendent of Melting, says, "Electric furnaces can do everything that open-hearth furnaces can and do a better job of making quality steel at lower cost."



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WHAT NATIONAL CARBON'S NEW SERVICE PROGRAM MEANS TO ONE ELECTRIC MELT SHOP

The TIMKEN Roller Bearing Company

■ April's Carbon and Graphite News announced the latest revision of a long-time National Carbon technical service — a concentrated electrode service program to help operators obtain the best possible electrode efficiency. This program, extending the company's customer service policy, is capsuled in a presentation of approximately an hour's duration. First given in Pittsburgh last December before the Electric Furnace Conference of the A.I.M.E., 38 customer meetings have been held by the National Carbon Electrode Service Group with enthusiastic response. The program is paying off in improved electrode performance, lower costs and an altogether better operator understanding of electrode operation.

For this interview, your Carbon and Graphite News Reporter has visited Timken Roller Bearing Company to bring you an on-the-spot discussion with Melting Superintendent, H. F. Walther; Assistant Melting Superintendent, L. D. Petersen; General Foreman, R. C. Roth; and First Helper, M. Podoliak. We asked these gentlemen to comment on the National Carbon program which had just been presented to a typical Timken melt shop group.

Q. Gentlemen, obviously from the group's response here tonight, you people are very much interested in electrode operation. We all know that electrode costs are an important consideration in electric furnace operation — do you feel that our program will help you reduce these costs?

A. Let's put it this way. Electrode costs and elec-

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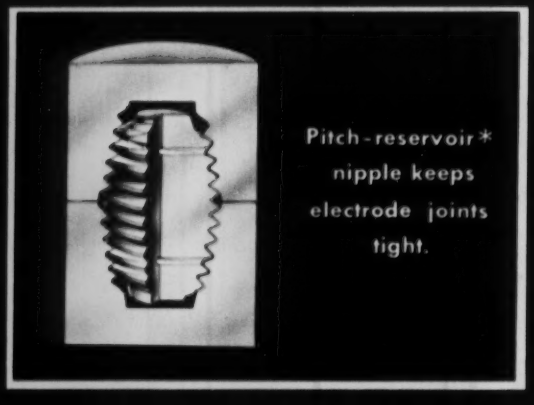
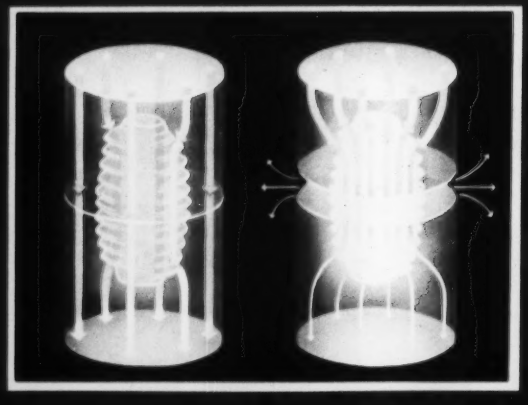


*U.S. Patent No. 2735705



Good joining gives efficient current flow.

Open joint heats up nipple, causes breakage.

tric power costs are two major items in producing electric furnace steel which together account for about half of our "cost above".

We've been preaching this idea right along, so we were especially glad to hear your technical people emphasizing the do's and don'ts that make for best electrode performance at lowest cost. As a matter of fact, we'd say that if we could have reduced our electrode consumption as little as one half a pound per ton last year, we would have shown a cost reduction of approximately $80,000!

Q. That's an eye-opening observation – let's hope you'll be able to chalk up a cost reduction like this in the near future. Now, suppose you were to name one operational problem that stands out above all the rest, what would you pick?

A. There are several, of course. Electrode breakage resulting from falling scrap can be one of the most troublesome, perhaps. At The Timken Company, we strive to avoid this by correctly placing our scrap within the furnace. We have emphasized to our people how improper scrap placement can lead to scrap "caves", and how this falling scrap can strike electrodes hard enough to break them. We were glad to see the importance you attached to this in your color slides and talk. Calling attention to the problem graphically like that helps our operating people visualize even better the necessity for placing heavy scrap on the bottom of the furnace – medium to light scrap above.

Q. A good portion of the time was spent here tonight discussing good joint-making procedure. Two points particularly seemed to stimulate a lot of interest: first, the importance of starting with a clean, chip-free end face and socket; and, second, the whys and wherefores of our recommendation that the connecting pin, or nipple, be added to the bottom of the old electrode rather than to the top of the new one. Would you like to comment on these points from your own experience?

A. Well, as to the matter of clean, chip-free end faces – it's easy to appreciate the desirability of maintaining maximum possible physical contact between the end faces of joined electrodes. Since ⅔ of the electric current goes through the end faces, we certainly want to avoid increased resistance at these interfaces. And, for the same reason, the sockets should be chip-free and clean so there will be no restriction between connecting pin and both sockets. It was good to hear you develop these thoughts further in your talk. Actually, that demonstrator unit of yours showed us more graphically than anything else we've ever seen just how seriously a lack of intimate electrical contact at the joint can affect electrode performance. It was easy for our men to associate the demonstrator's brightly glowing lamps with the unrestricted passage of current that results from a good, clean, tight joint. And, conversely, the dimly glowing lamps readily got across the idea of the poor passage of electrical current which occurs when joints are improperly made. You people must be receiving considerable comment from the field on this novel demonstrator unit.

Q. Yes, that's right–we're getting a lot of evidence that it's helping promote a better understanding

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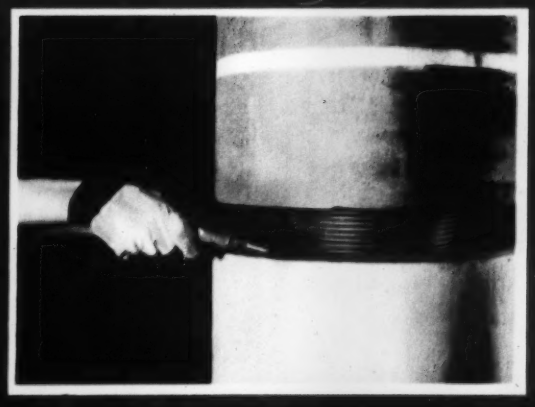
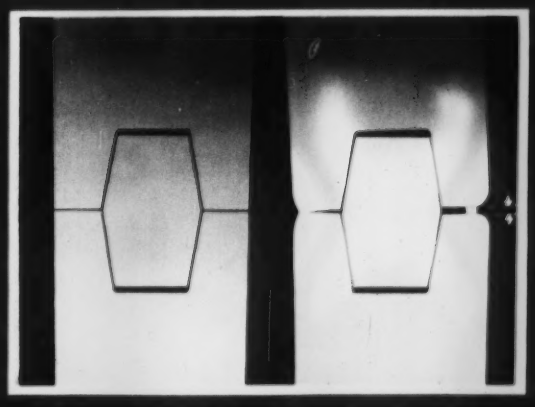


Use air hose for easy, sure removal of chips



What happens when chips remain on the face

of just what does take place at the electrode joint. And, it also helps operators understand some of the reasons for our recommended electrode handling practices. Perhaps there was some development touched on tonight that impressed you particularly – something you'd like to comment on?

A. One especially – we think one of the most significant developments in the electrode field in many years is your new pitch reservoir nipple. It has enabled such an improvement in joint-making practice that electrode and nipple breakage from unwinding has just about been eliminated in our shop. This has reduced electrode consumption.

You know, here at The Timken Company we were one of the first shops to recognize the potentialities of this new pin – and, we were one of the first to adopt it. Your cut-a-way color slide tonight showed our men exactly how the pitch in this new pin cokes under heat to lock the electrode joint firmly together. This was particularly well illustrated, we thought.

Q. Well, gentlemen – we certainly have appreciated the chance to meet with you here at Canton tonight and exchange ideas. As a parting shot, if you had to pinpoint the most valuable aspect of these meetings, what would it be – where would you say they're most helpful?

A. We think it's been a big help in two ways. First, your vivid presentation of the basic factors underlying our electrode costs has highlighted the problems our furnace crews face everyday. Second, there's no doubt, after the free give-and-take discussion here, that our men will put a lot of these basic ideas into practice, resulting in a long-term benefit to our company. In fact, we expect this will stimulate many more discussions of our own. Thanks for coming.

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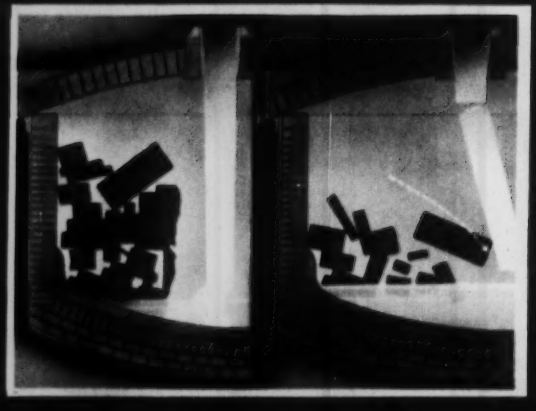
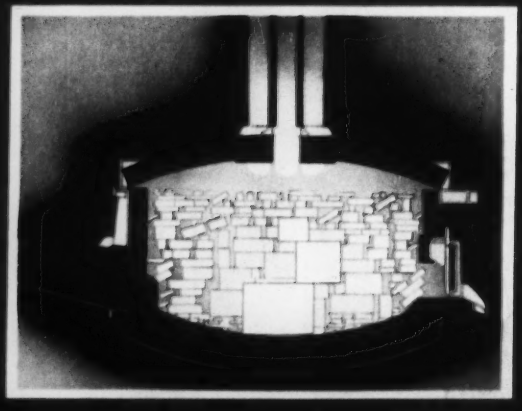
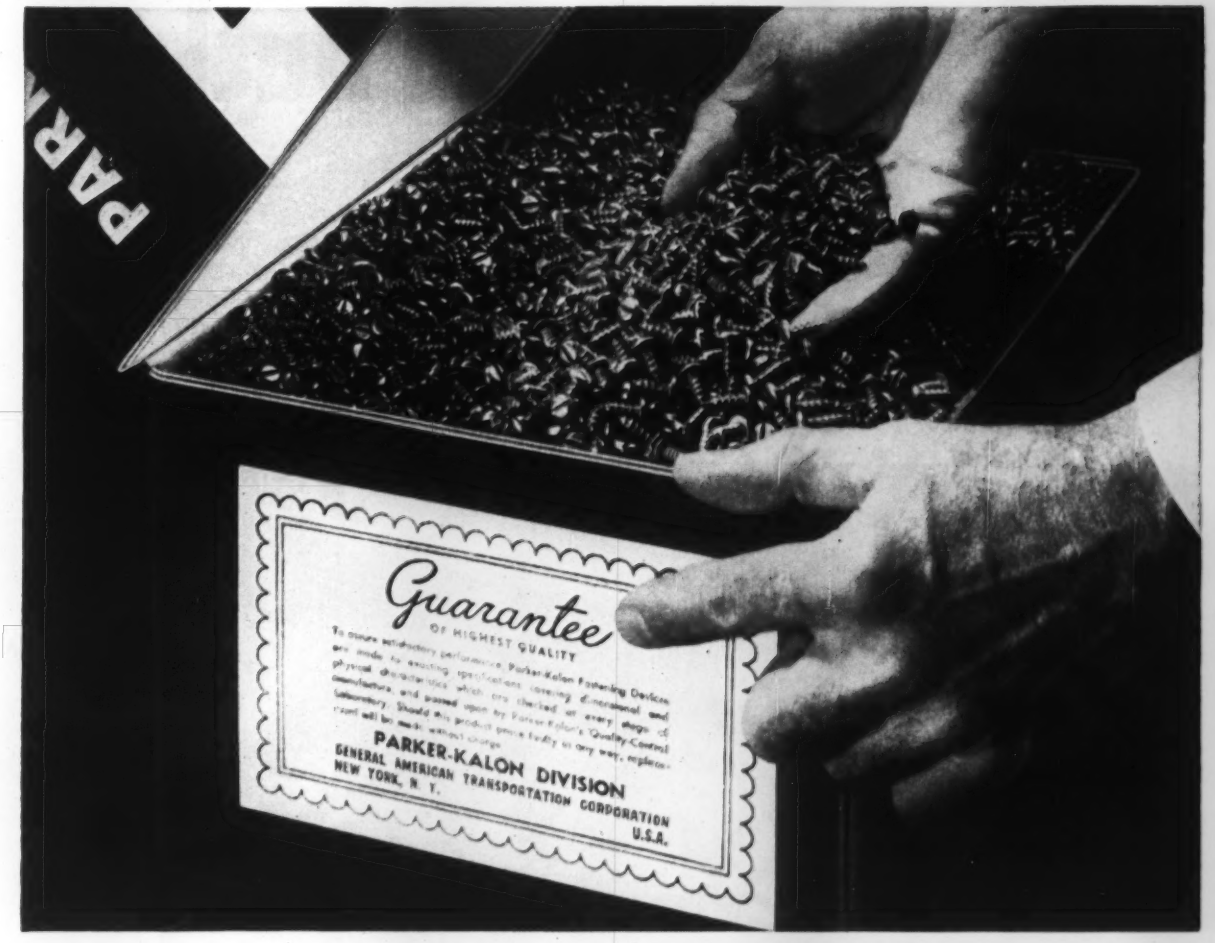


Effect of improper placement of the scrap



Proper positioning, heaviest scrap at bottom



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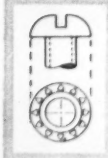
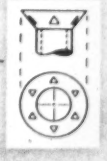
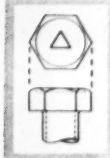


Non-Countersunk Heads—12 impressed triangles under head

Countersunk Heads—6 impressed triangles under head





Hexagon Heads—1 embossed triangle on top of head

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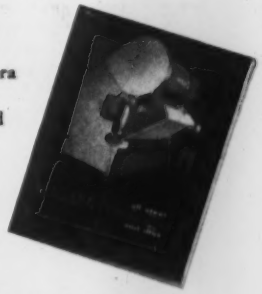

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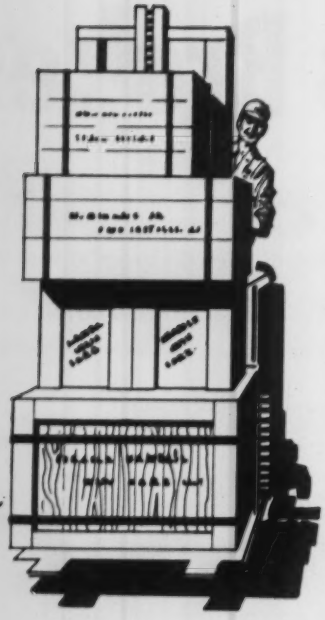
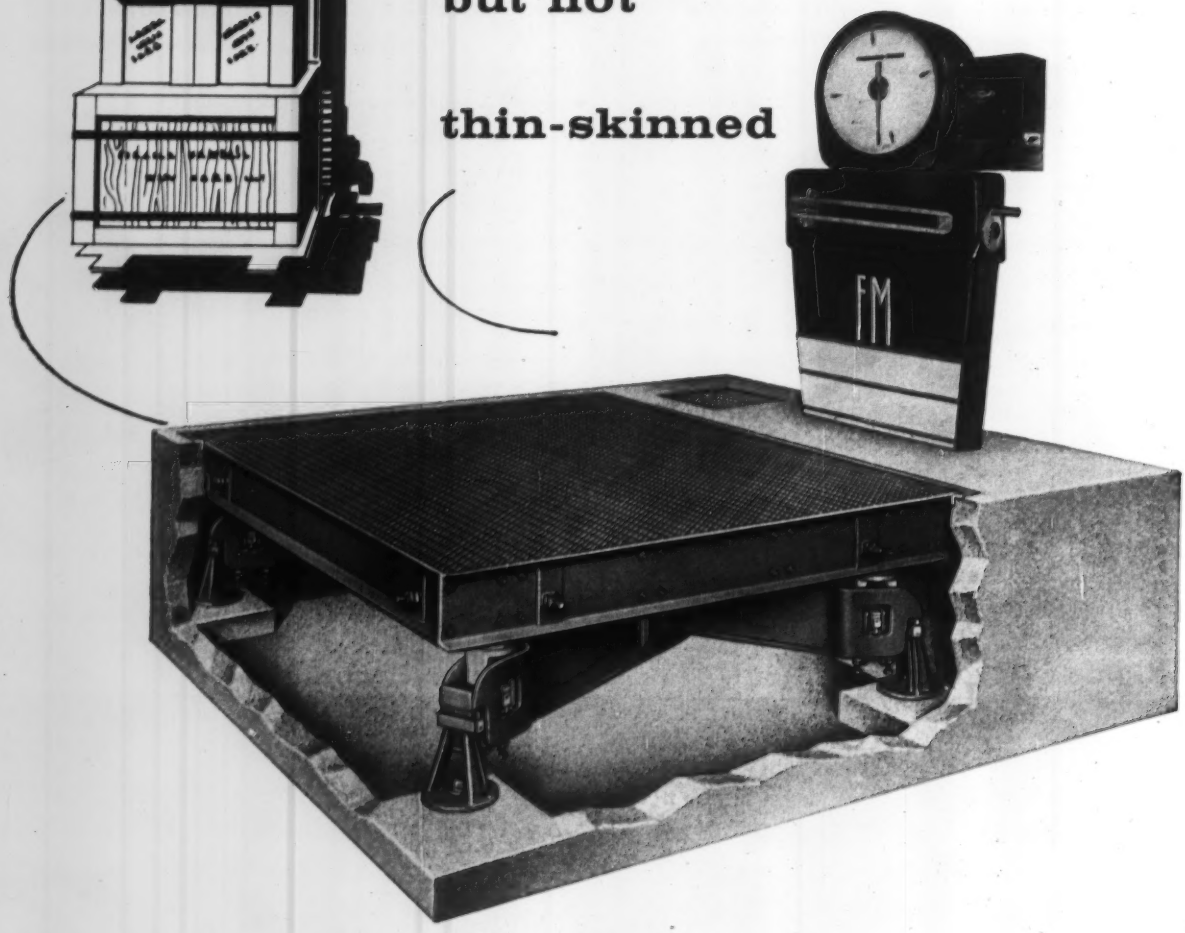


Sensitive but not thin-skinned



A heavily loaded lift truck throws quite a punch at a scale when it rolls on to the platform and stops. A good scale must be designed to absorb this impact without damage to other qualities which make it a precise and delicate weighing machine.

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SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

INDUSTRY'S FIRST OXYGEN CONVERTERS

fabricated by Pennsylvania Engineering Corporation

The first top blown oxygen steel converters in the United States were fabricated by PECor for McLouth Steel Corporation. Completely assembled, aligned and operated in our shops before shipment, they feature greatly increased efficiency in the tilting mechanism and drives, precision cut gearing, anti-friction bearings and rugged, extra heavy-duty design throughout.

Whether your needs involve steelmaking or non-ferrous smelting or refining, handling of hot metal, slag, cinders or other metal production operations, depend on PECor—a new symbol for Pennsylvania Engineering Corporation's more than 75 years of experience in engineering and building top-quality equipment for the metal producing industries.

WRITE for complete PECor catalog.

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PENNSYLVANIA ENGINEERING CORPORATION

NEW CASTLE, PENNA.

OTHER STEEL PLANT EQUIPMENT WE BUILD

Blast Furnaces . . . Open Hearth Furnaces . . . Hot Metal Mixers . . . Hot Metal Mixer Cars . . . Ladles . . . Ladle Transfer Cars . . . Scrap Cars . . . Slag Cars . . . Ore Transfer Cars . . . Thermo Metal (Bottle) Cars . . . Jack Cars . . . Ingot Cars

ENGINEERS • FABRICATORS • ERECTORS

CYLINDRICAL GRINDERS

10" Type CTU and 14" Type LCTU. Semiautomatic or plain. For plunge or traverse operations, from roughing cuts to finest finishing. Can take a wide range of multi-wheel mounts. In production line and job shop work these machines have doubled production, replaced several machines, eliminated extra operations. *Catalog No. 1787*

10" Type CV-4 and 14" Type LCV-4 Angular Wheel Slide. Semiautomatic machines that grind thrust surfaces and adjacent diameters in one fast, automatic plunge operation. They leave a concentric grain pattern in the thrust surface finish, assuring a better seal surface and appearance. *Catalog No. 1658*

Type CM-1 Heavy Duty Multi-Wheel. Semiautomatic. Makes four or more cuts simultaneously, in a single plunge-grind cycle. Brings new speed, accuracy and economy to the grinding of multi-diameter parts. Many automatic features, including one-lever control. *Catalog No. 1550*

ROLL GRINDERS

Type C-2. A heavy duty machine, featuring faster cutting, quicker set-ups, easier operation. Available as a plain, semiautomatic or roll grinder. One-lever control of grinding cycle on the semiautomatic. As a roll grinder it includes the famous Norton tilting wheel head. *Catalog No. 1827*

CAM GRINDERS

NO. 3 CAM-O-MATIC® Cam Grinder. An automatic, hydraulic machine that is setting new standards for production, precision and finish. Grinds all cams and the camshaft eccentric successively and automatically, in one handling. Entire operation geared to split-second efficiency. *Catalog No. 191*

Check these guide books to

bigger grinding profits

Get the facts on how Norton grinding machines can benefit your production

In building the world's largest line of grinders and lappers — including automatic machines and machines for specialized operations — Norton offers you the greatest opportunities to modernize.

A representative selection of Norton machines is listed here, together with their catalogs. It will pay you to send for any catalog that concerns your grinding or lapping operations. Learn how replacing your obsolete equipment with new Norton machines will enable you to meet competition with the best production tools in the field. Learn also, how the Norton Lease and Financing Plans enable you to modernize, yet conserve your capital.

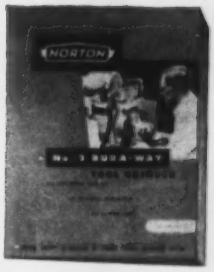
Ask your Norton representative for the literature you want, or write direct. And remember: only Norton brings you such long experience in both grinding machines and grinding wheels — to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

CRANKPIN GRINDERS

Automatic Transfer Type. For completely automatic crankpin grinding — a news-making Norton *"first."* Locates, grinds, gages, transfers — all automatically — cutting costs on each crankshaft ground. Typical of Norton's rapid progress in automatic operation. *Catalog No. 1837*

CUTTER AND TOOL GRINDERS

No. 20 Cutter And Tool Grinder. Fastest, most versatile machine in its class. Wheel head tilts 15° above or below horizontal and swivels through 360°, simplifying many difficult grinding jobs. Easy to set up, operate and maintain. *Catalog No. 189*



No. 2 BURA-WAY Tool Grinder.* Unequalled for grinding convex single point and form tools. Generates, produces and maintains relief angles constant in the direction of the feed. Duplicates the master tool form exactly. Extends the life of carbide-tipped and other tools. *Catalog No. 220*

UNIVERSAL GRINDERS

Type U-4, 12" x 36" and 12" x 48". Quick, easy set-ups plus fast grinding action save time and costs on a wide variety of external, internal, face and angular wheel-slide jobs. Simply turning a dial gives an infinite number of works speeds over its 40 to 400 rpm range. *Catalog No. 231*

LAPPERS

HYPROLAP Lapping Machine No. 48F.* An extremely fast, high production machine for single or parallel face flat lapping. Bonded abrasive laps produce work pieces free of grit. Three arrangements: plain, timed cycle; automatic continuous feed; semiautomatic continuous feed. *Catalog 1954*

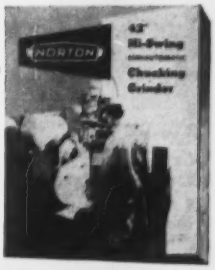
Vertical Lapping Machine No. 16FC. Outstanding productive capacity for flat work up to 3" x 5" and cylindrical work up to 3" diameter. Can produce optically flat surfaces and diameter tolerances in millionths, with fine repetitive accuracy. *Catalog No. 212.*

SURFACE GRINDERS

8" x 24" Hydraulic. Grinds plane surfaces speedily and economically, in large stock removal or close tolerance operations. Designed with both hand and hydraulic table cross feed. Convenient controls and easy accessibility reduce operating and maintenance time. *Catalog No. 190*

SPECIAL GRINDERS

42" Hi-Swing Semi-Automatic Chucking Grinder. For rapid, accurate grinding of large diameter, short parts, such as jet engine compressor wheels and similar components. Takes work held by chucks, face plates or special fixtures and permits grinding several surfaces without disturbing the set-up. *Catalog No. 1780.*



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Making better products . . . to make your products better

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Faster, easier welding of work pieces up to ½ ton with

FREE-HAND ROTATION

of the new P&H Model UP-1000 Welding Positioner

Costs shrink when you install this new P&H Model UP-1000 Positioner. A light touch of the hand rotates the work piece to any position — permitting faster, easier welding. And this easy-to-use P&H Positioner also revolves a full 360° in two planes to provide cost-cutting downhand welding on all types of weldments.

Designed for weldments up to ½ ton, this P&H Positioner maintains static balance in all positions, even when the arm is adjusted up or down to horizontal settings. Because the UP-1000 has a protected friction clutch, you get positive braking of rotation — the weldment is always securely fixed right where you want it.

For greater welding efficiency, safety, and improved quality, use the P&H UP-1000 on all jobs up to 1000 pounds. Send in the coupon for Bulletin P-22.

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MILWAUKEE 46, WISCONSIN

I'M SMOOTHARC SCOTTY...and I'm a hard man with a penny. That's why I recommend our FREE bulletin on the new P&H UP-1000. It tells you how to save time and money. Send for it.

P&H UP-1000 Positioner for all jobs up to 1000 pounds. 26 other P&H Positioner Models to choose from.

P&H

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Welding Division
4411 W. National Avenue, Milwaukee 46, Wis.
Attention: W. R. Stephens, Sales Manager

Please send me Bulletin P-22 with information on the P&H UP-1000 Positioner.

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Company .....

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City ..... Zone ..... State .....

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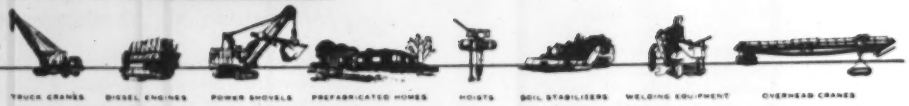
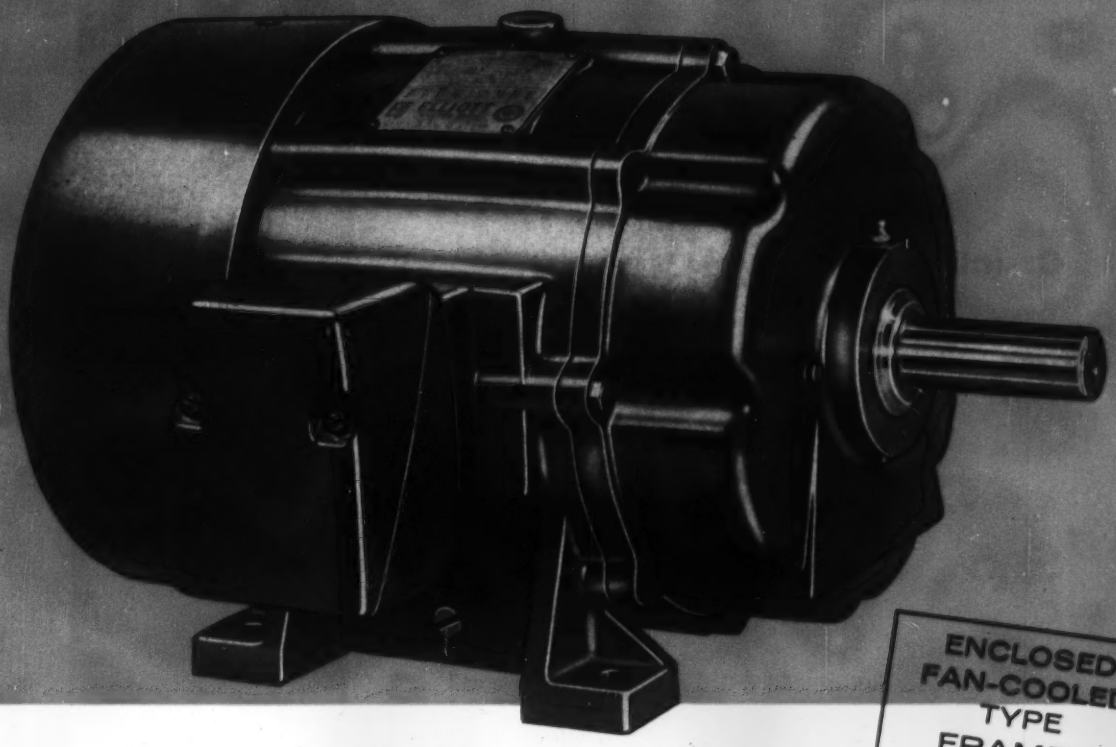
the P&H *line*



P&H welding equipment is manufactured and sold in Canada by REGENT EQUIPMENT MANUFACTURING COMPANY LTD., 455 King Street West • Toronto, Ontario, Canada

Inside and Outside . . . entirely new



ENCLOSED FAN-COOLED TYPE FRAMES 184-256U

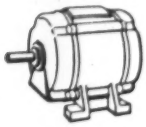
Elliott C-W Type N Motors

NEW PERFORMANCE! You get more horsepower per pound from these compact Elliott C-W motors because of their improved design, and the use of vastly superior insulating materials and electrical steels. Due to greater mechanical and dielectric strength, insulating materials occupy less space. More space is available for copper—the "muscle" of the motor.

NEW PROTECTION! Internal parts of Elliott C-W motors are completely protected by rugged housings—dripproof, or totally-enclosed, as required. Efficient fans assure ample cooling.

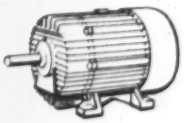
NEW DEPENDABILITY! New Elliott C-W type N motors are designed for the utmost in dependability. They will withstand physical abuse. Use of highly dependable insulating materials assures prolonged life; anti-friction bearings are available in several optional types, to meet severe service conditions.

OTHER C-W TYPE N MOTOR ENCLOSURES



Totally-enclosed non-ventilated

Dripproof Protected



Totally-enclosed, fan-cooled (ribbed frame)

ELLIOTT Company

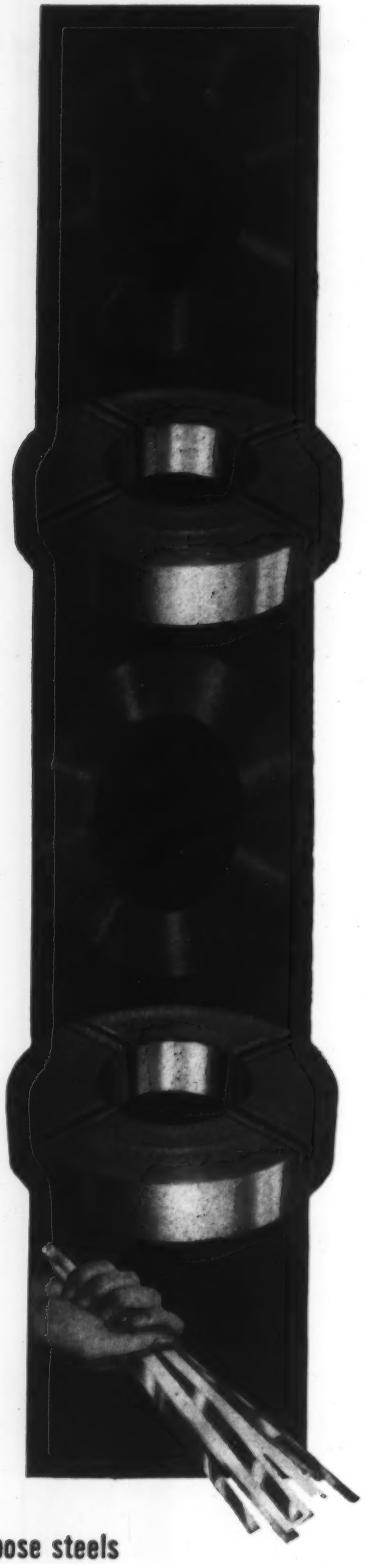
CROCKER-WHEELER DIVISION

WRITE for new bulletin describing Elliott C-W Type N Motors. Address: Elliott Company, Crocker-Wheeler Division, Jeannette, Pa.

WS-4

Crucible gives you
wide selection,
dependable delivery of

Cold Rolled Specialty Steels



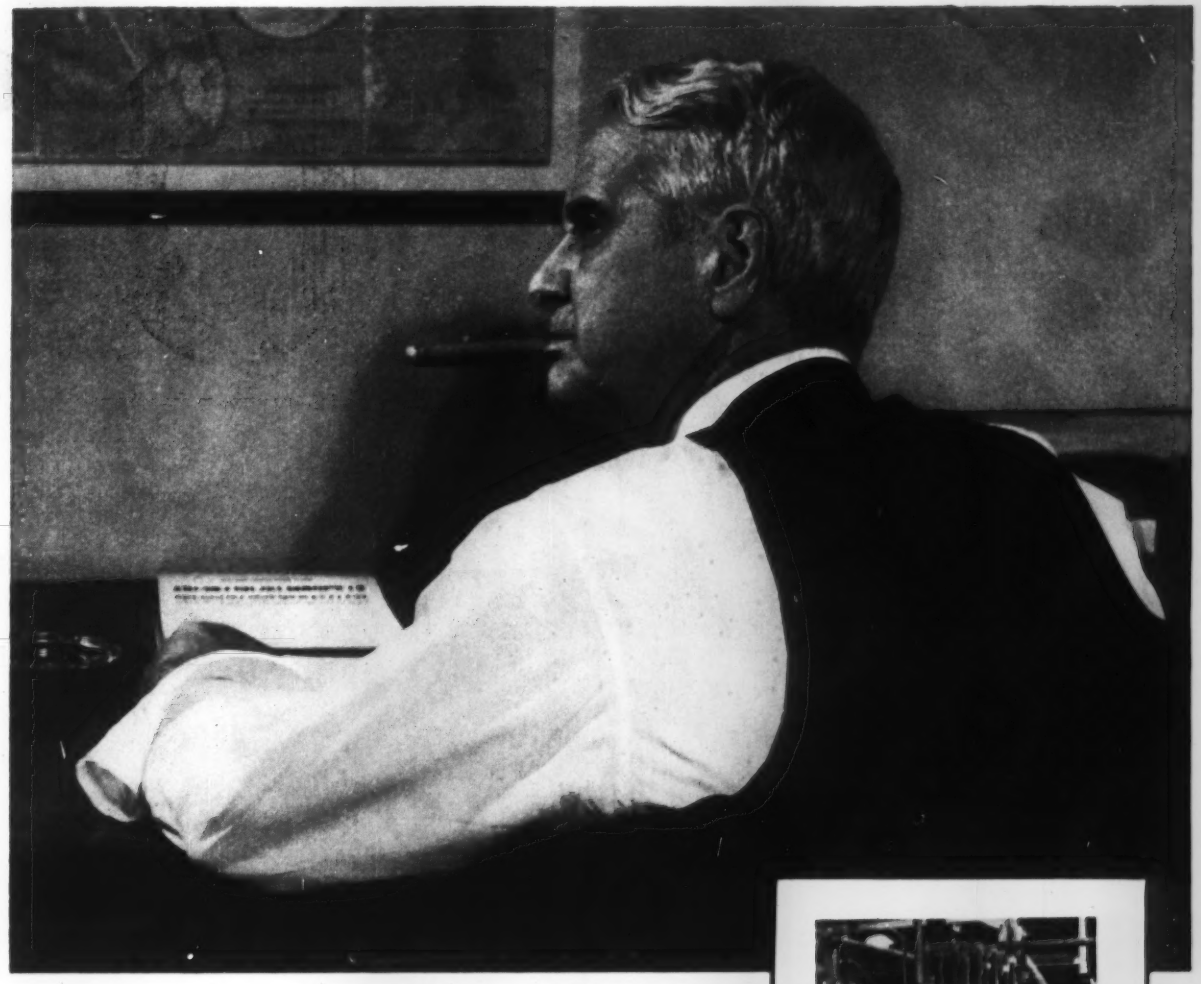
For a *full* selection of cold rolled specialty steels — call Crucible. Deliveries are on-schedule — in the size, grade, finish or length you need.

And Crucible's new mill facilities mean closer control of rolling . . . insure greater physical uniformity . . . fine finish . . . better edges . . . flatter strip.

Whether you use carbon spring steel, alloy strip steel, or many other ferrous analyses that can be cold rolled, you can't beat Crucible. More information is contained in the 32-page booklet, "Cold Rolled Specialty Steels". Write for your free copy now. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



"And I say it has to be an ALDRICH PUMP!"

The heart of any central hydraulic system is the pump. And if the pump is an Aldrich you can be sure of 100% availability of hydraulic power, with either oil or water.

The very simplicity of the Aldrich Direct Flow design means horizontal straight line flow from suction to discharge. Reduced space between valves results in higher volumetric efficiency. Fluid-end sectionalization for fast, easy maintenance; changeable plunger sizes; and interchangeability of parts are additional reasons why Aldrich Pumps have earned a reputation for dependable, low cost performance on applications such as die casting, hydraulic press operation, roll balancing, descaling and hydraulic testing.

For your tough pumping problems, it pays to specify Aldrich. Write today for a copy of Data Sheet 100, a condensed catalog and selection chart covering our entire line. The Aldrich Pump Company, 18 Pine Street, Allentown, Pa.

Four 5" stroke Aldrich Direct Flow Pumps on die casting service in a midwestern metalworking plant. These pumps are handling 250 gpm at 1500 psi.

THE ALDRICH PUMP COMPANY

Use WELDED STEEL for Greater Strength with Less Weight!

Above you see one of four identical pieces recently produced and machined by Mahon. It is part of a machine designed for use in the manufacture of paper plates. This piece, and the parts and assemblies illustrated at the left, are typical of thousands of Steel-Weld Fabricated units produced and machined by Mahon for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. Are YOU making full use of welded steel components in your products? In some instances pattern cost and time are an important factor . . . in others the strength-weight ratio is important. In the design of almost any type of heavy machinery, there are pieces and sub-assemblies that lend themselves to more economical production in welded steel. If you build such machinery or equipment, you will be interested in Mahon's facilities to serve you . . . because, the Mahon organization is a unique source for welded steel in any form . . . a source with complete facilities for design engineering, fabricating, machining and assembling. See Sweet's Product Design File for information, or have a Mahon engineer call at your convenience.

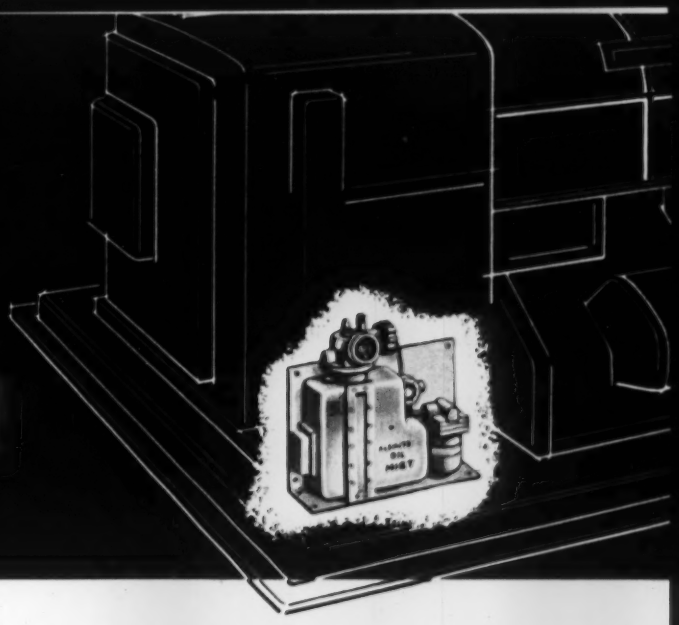
THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago

Engineers and Fabricators of Steel in Any Form for Any Purpose

MAHON

save up to 90% on lubricating costs!



ALEMITE OIL-MIST AUTOMATIC LUBRICATION

multiplies bearing life...cuts product spoilage ...boosts machine output in almost every industry!

Alemite Oil-Mist Automatic Lubrication brings remarkable savings . . . in lubricants, man-hours, bearing life, and decreased product spoilage.

Alemite Oil-Mist *atomizes* oil into mist—distributes it through tubing to bearings—bathes all bearing surfaces with a cool film of clean oil. Maintains uniform oil film on plain and anti-friction bearings, gears and chains—despite variations in load, temperature or speed. Amazingly simple, continuous and fully automatic . . . Alemite Oil-Mist eliminates the waste and uncertainties of the "human element" in lubrication.

Let us show you how Alemite Oil-Mist provides more efficient, foolproof lubrication, at lower cost! Mail coupon below for a graphic demonstration!

8 ADVANTAGES of the ALEMITE OIL-MIST System

1. Continuous Lubrication—Constantly deposits fresh, clean film of oil on all surfaces of all bearings in the system.

2. Fully Automatic Lubrication—Can start and stop with operation of machine switch.

3. Elimination of Guesswork—No bearing can be over-looked, nor over-lubricated! Every bearing picks up only as much Oil-Mist as it needs.

4. Reduction of Bearing Temperatures—Acts as bearing coolant, can lower bearing temperatures as much as 20° F.

5. Reduction of Types of Oil—Reduces number of oils that must be stocked, handled, and applied.

6. Elimination of Downtime—All bearings in the system are constantly lubricated while machines continue to operate.

7. Extension of Bearing Life—Multiplies bearing life many times. Life of grinding machine bearings has been extended from 400 to 7,000 hours!

8. As High As 90% Less Oil Consumption—Alemite Oil-Mist usually consumes about $\frac{1}{10}$ the amount consumed by any other oiling method!

Alemite Oil-Mist Lubricates ALL Types of Mechanisms

Anti-friction Bearings | Plain Bearings | Chain | Gear | Gear Cases

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Alemite Division of Stewart-Warner, Dept. BB-96
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☐ Please send me a FREE copy of your new and complete Oil-Mist catalog.

☐ Please have your Alemite Lubrication Representative arrange a no-obligation demonstration.

My Name

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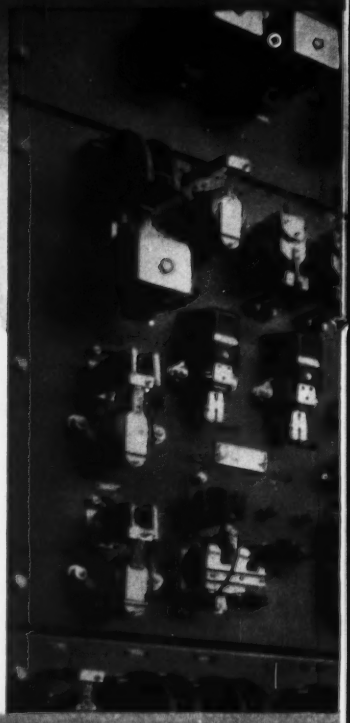
expanding mill standardizes on



To meet ever-increasing demands for specialized steel, an eastern mill has completed an extensive expansion program consisting of a new reversing cold mill and two auxiliary lines. Significantly, Allis-Chalmers control is utilized in all three operations.

Progressive mills are taking advantage of Allis-Chalmers experience in engineering, building and applying steel mill control — control that provides smooth, precision performance — control that affords maximum production and top quality with a minimum of outage time and maintenance. Get all the facts about Allis-Chalmers mill control. See your A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

PICKLING LINE

The Allis-Chalmers control on this line provides an exceptionally wide speed range of more than 15 to 1. Power for the line comes from three separate m-g sets employing magnetic amplifiers for quick response. Complete synchronization between entry, processing and delivery sections permits continuous mill operation.

ANNEALING LINE

This control features power-type magnetic amplifier regulation for accurate control and low maintenance. Variable voltage power is obtained from a six-machine m-g set. Speed regulation of .5% assures constant strip speed and a resulting uniformity of high quality steel. Open-type control boards utilize Allis-Chalmers components especially designed for mill operation.

ALLIS-

STEEL

REVERSING MILL

Critical percentage reduction of specialized steels rolled with this mill requires exacting control. Main mill voltage and reel tension circuits utilize new high-gain magnetic amplifier control. Because the magnetic amplifier is a static device, maintenance and necessity of replacement parts are reduced to a minimum. Fast arc-centering blowout on the dc contactors, shown on the control board, extends contact and chute life. Exceptional interchangeability of contactor and relay parts affords maximum convenience and economy.

A-C ALLIS-CHALMERS

A-4971

CHALMERS

NOW...

You Can Cut Costs with

THE FERRY CAP

Countr-bor®

SCREW

Used in *standard* counterbored holes and for other socket head screw applications, the Countr-Bor Screw offers important advantages:

Faster wrenching—faster assembly
Using *standard* wrenches
Externally wrenched, it *"tightens tighter"*
In fact, *double savings*—savings in
(1) Cost of product and (2) Cost of assembly
Made of alloy steel—maximum strength
Better appearance

On the market only a comparatively short time, the Countr-Bor has met with the hearty approval of designers, engineers, and production men in solving tough assembly problems and speeding production.

Send for samples.

You'll receive prices, complete information and samples promptly upon request.

Any type socket wrench handle with standard 12-pt. socket is used for counterbored applications.

Ferry Cap Countr-Bor Screws
PATENT APPLIED FOR
MANUFACTURED SOLELY BY

THE FERRY CAP & SET SCREW COMPANY
2159 SCRANTON ROAD • CLEVELAND 13, OHIO

Productioneered

by Lodge & Shipley

...all adjustments in front!

...all clear in the back!

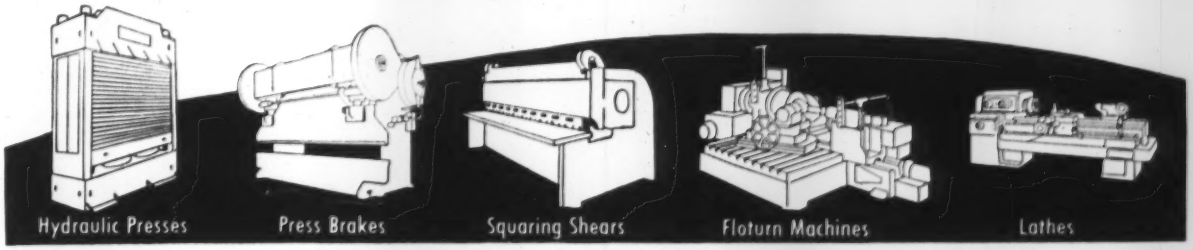
If you want a new standard of shearing performance ... and lower costs too ... investigate the proven features of the new Lodge & Shipley Squaring Shears. Engineered to production standards, these new shears represent more than 75 years of experience in development and refinement of metalworking equipment.

Many of the new and exclusive features combine to keep the operator in front of the machine and on top of his job. "Out front" adjustments and "all clear" design in back of the shear means that production can flow steadily at lowest cost!

New literature details the ease of operation, effortless accuracy and notable economy of Lodge & Shipley Shears. Write for your copy of Bulletin PS-9:

The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.

Outstanding Lodge & Shipley Features ... Combination Air Clutch and Brake ● Long Life Gear Train ● Inclined Ram ● Air Ram Counterbalances ● Positive Lubrication ● Front Operated Back Gauge ● Positive, Safe Holddowns ● Forged One-Piece Eccentric Shafts ● Front Adjusted Ram Back Brace ● Front Adjusted Blade Clearance and Indicator



Expensive parts machined to close tolerances are always in danger of being scratched by jagged chips hiding in the weave of ordinary wiping material. Parts so damaged have to be reworked . . . sometimes scrapped entirely.

This wiping job could cost $50

Easy to distribute

Really soak up oil . . .

Always a clean one handy . . .

Just toss 'em in the trash . . .

When you use Scott Wipers, chips don't come back to scar men and metal . . . there's always a clean new wiper handy. You use one thoroughly and throw it away. No more expensive collection, sorting, laundering and distribution.

. . . this one cost less than ½¢

The difference is . . . Scott Wipers

Strong, highly absorbent Scott Wipers can be used and re-used. Yet they cost so little you can throw them away after a single use when the job calls for a clean wiper, free of chips and abrasive material.

Scott Wipers are reducing the cost of wiping in many companies. Sorting and baling are eliminated. Handling and distribution are simplified. Laundering becomes a thing of the past.

This is sanitary wiping. A man uses a Scott Wiper thoroughly, throws it away—takes a new one. No danger of cuts from hidden chips . . . no fear of skin infection from dirty wipers.

Your local Scott representative or distributor will demonstrate the Scott Wiper in your plant. Call him or mail this coupon today.

Another quality product of . . .

SCOTT PAPER COMPANY

Scott Paper Company
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Please send me more information about Scott Wipers.

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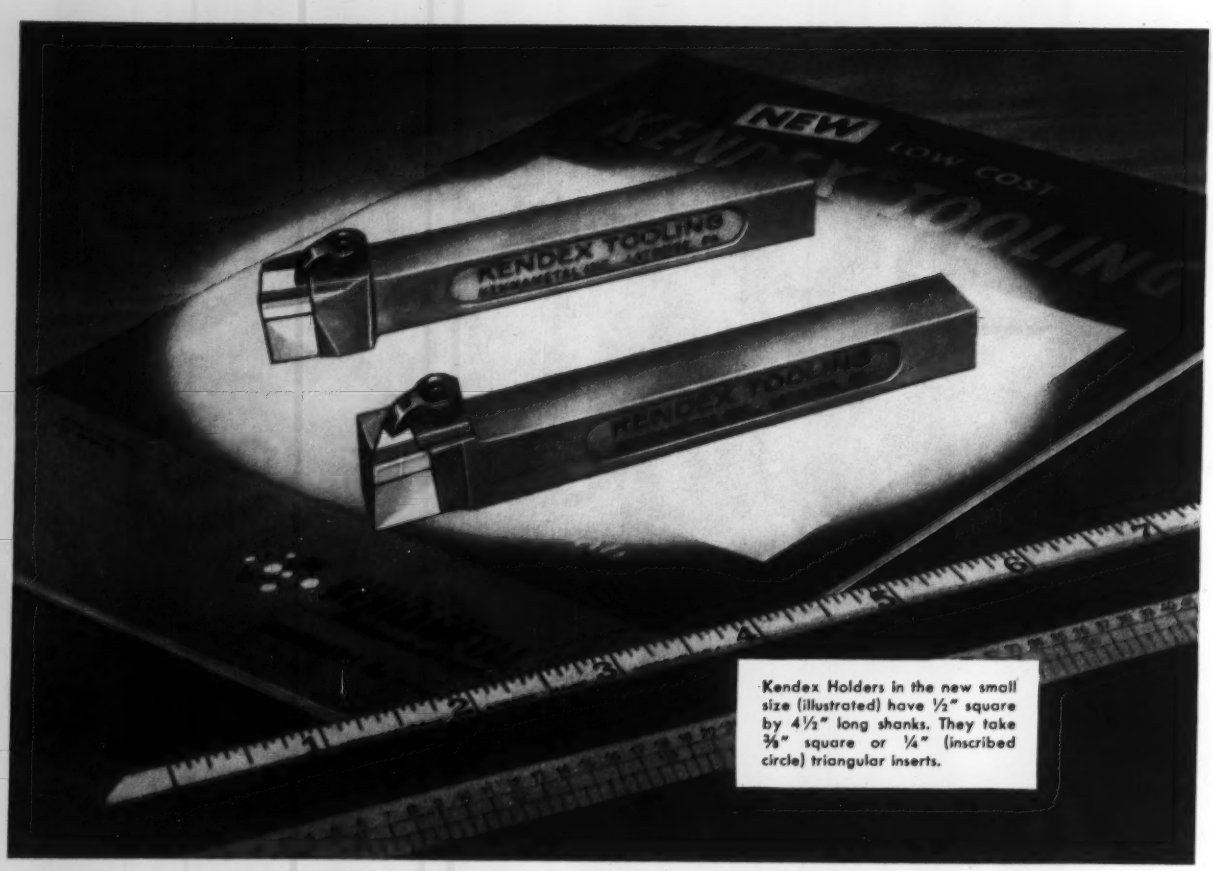
Company _____

Position _____

Address _____



Kendex Holders in the new small size (illustrated) have ½" square by 4½" long shanks. They take ⅜" square or ¼" (inscribed circle) triangular inserts.

NOW, small Kendex* Button Tools with turnover "throw-away" inserts

...for light machining on high production operations
...especially useful for boring operations

Another variation of the popular Kendex Tooling is now available. This is the new ½" Kendex Holder, available in four styles, for use with triangular or square Kennametal* "turn-over" button inserts . . . making available small tools with the many advantages and economies of the Kendex principle:

- grinding is eliminated
- inserts are indexed quickly to each new cutting edge
- machine downtime is reduced to a minimum
- production is increased

If you are interested in small-sized, rugged, dependable clamped-type tooling, ask your Kennametal tool engineer to show you how these small Kendex holders can be used to advantage on your operations. Or write for Booklet 301. KENNAMETAL INC., Latrobe, Pennsylvania.

*Registered Trademark

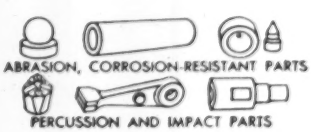
B-8978

Small-sized Kendex Tools are equipped with Kennametal chip breakers and solid Kennametal seats to back up inserts.

Kennametal inserts for small Kendex holders are stocked in a number of grades including the new K7H grade for high velocity operations and for machining heat-treated or high tensile steels.

Tell us your small-tool problem and our tool engineers will help you select the right tool and grade of cutting edge.

INDUSTRY AND
KENNAMETAL
...Partners in Progress



When history proves all progress starts with change

How can anyone watch new methods being adopted

Yet not seize those methods himself

WHY

don't you ask your LINCOLN ENGINEER about the LATEST welding advances to cut your manufacturing costs

If you build a product or machine why shouldn't it be made from welded steel?

If you build bridges or buildings why use rivets when welded designs cost less?

If you want to cut welding costs why not use Lincoln's money-saving methods for manual and automatic welding?

Why not call in Lincoln now?

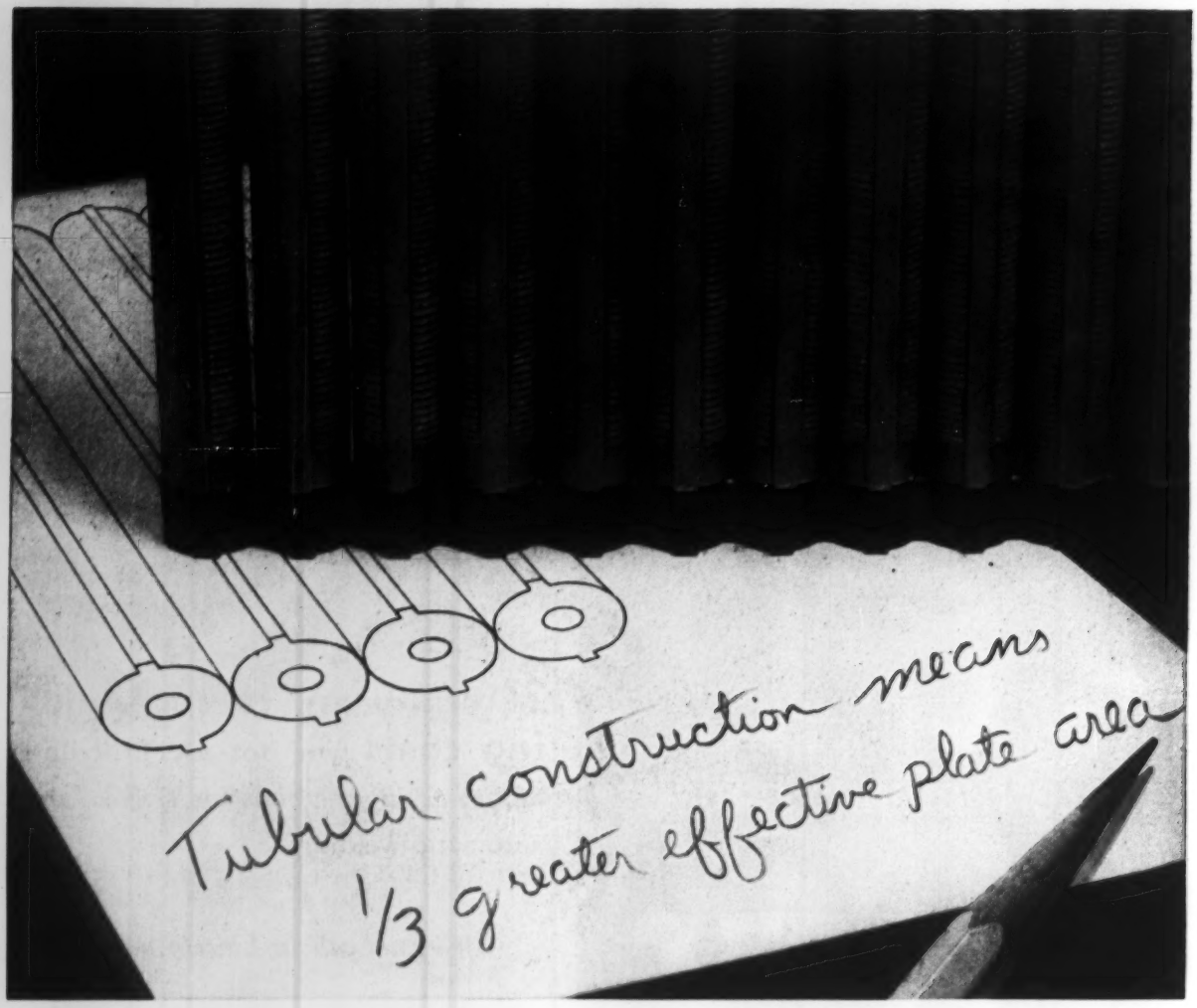
Write

THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

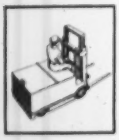
The World's Largest Manufacturer of Arc Welding Equipment

EXIDE-IRONCLAD BATTERIES



Greater effective plate area boosts power for peak loads

BATTERY FOR POWERED HAND TRUCK, Model TH. Fits snugly into space provided on truck. Has tubular construction of positive plates, Silvium grids, "Permanized" negative plates, extra heavy connectors and all other Exide-Ironclad advantages that mean power to spare in heavy duty applications. Write for Bulletin 5161.



According to general principles of storage battery engineering, power reserve is governed by positive plate area. In the Exide-Ironclad greater effective plate area is achieved without increasing plate size. Here's how:

In the Exide-Ironclad positive plate, active material is held captive in tubes of slotted polyethylene. These tubes are arranged in a tight row with electrical connections only at the top. The actual surface of the plate is the combined semicircular sides of these tubes—the total surface area being roughly one-third more than the projected dimensions of the plate.

In use, this unique design feature means that more active material is exposed to electrolyte for a given size battery. It means the battery can provide power to spare for peak loads as well as a dependable source of continuous power.

Only Exide-Ironclad Batteries have this advantage. Be sure to specify them when you order—for either new equipment or for replacement. Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

Exide®

For the newest in coated abrasives . . . watch BEHR-MANNING!

Behr-Manning Abrasive belts speed production all along the line.

Behr-Manning Specialties are naturals for hard-to-get-at areas.

Behr-cat pressure-sensitive tapes are favorites in plants everywhere.

Smoothing-the-way to better surfaces

With BEHR-MANNING SPEED-WET METALITE Fibre Discs on the business end of your grinder, you'll breeze through surface preparation jobs in a jiffy. In addition, these rugged, sharp-cutting discs assure increased grinding mileage on the roughest of jobs. The combination of tough Aluminum Oxide grit, a DURABONDED adhesive, and the all-fibre backing make this possible. Try them on your next grinding operation. Your local Behr-Manning Field Engineer will gladly demonstrate, or write Behr-Manning Co., Troy, N. Y., Dept. S-9.

In Canada: Behr-Manning (Canada) Ltd., Brantford
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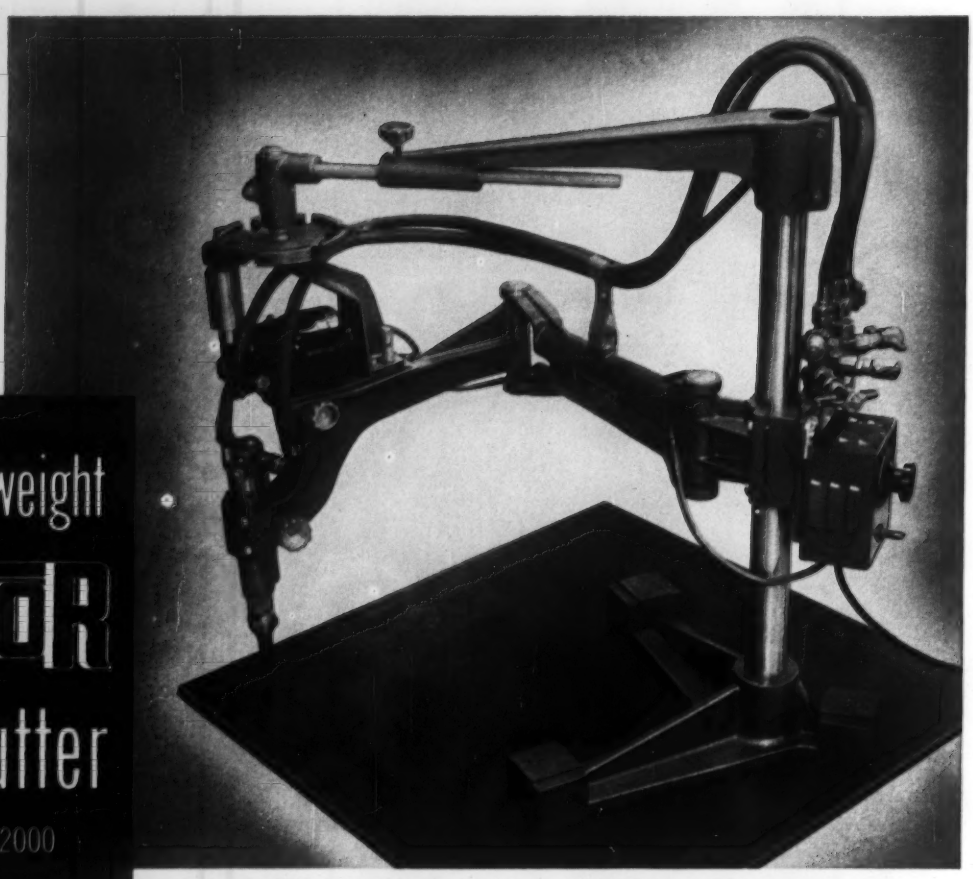
BEHR-MANNING CO.

A DIVISION OF NORTON ABRASIVES

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

S-9



New, lightweight VICTOR Duplicutter

MODEL DC 2000

Portable Model DC-2000 cuts circles to 19½" diameter, rectangles to 12" x 35", and metals to 8" thick. Torch accommodates all Victor 1-101 and 1-100 cutting tips, through size 5.

Flame cuts parts accurately, saves handling and set-up time, increases labor efficiency.

This portable VICTOR DUPLICUTTER weighs only 36 pounds. Operator easily carries it to any work location in plant, field or warehouse . . . thus saving you time and cost of moving materials. Set-up takes minutes only. You lose no time leveling DUPLICUTTER—its magnetized feet use stock being cut as working base. And it's so simple one man easily handles production from 2 or 3 DUPLICUTTERS.

Precise controls and powerful, permanent magnet in template follower enable you to duplicate parts to production tolerances of plus or minus 1/64". Easy, quick interchange of templates makes DUPLICUTTER practical for both long production runs or duplication of single part.

Why not see for yourself how easily the VICTOR DUPLICUTTER handles, how fast and accurately it cuts? Call your VICTOR dealer NOW and ask him for a demonstration on your job . . . or write us for descriptive Bulletin 353.

For maximum efficiency and safety, use genuine Victor tips and parts

VICTOR for welding

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

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4 REASONS FOR SANDVIK'S SUCCESS in Spring Steel applications like these

- *Special Physical Properties*
- *Fine Surface Finish*
- *Accurate and Uniform Gauge*
- *High Fatigue Life*

SANDVIK Swedish Specialty Strip Steels are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical instruments, etc. • Razor Blades • Reeds • Shock Absorbers • A Wide Variety of Springs • Trowels • Vibrator Reeds • Piston Ring Segment and Expanders, etc.

SS-88

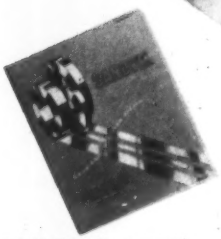
The partial list of Sandvik applications shown below is, in itself, good evidence of Sandvik steel's quality. In every case, Sandvik's performance is vitally important.

If you have an application where spring steel performance is important, check with SANDVIK. There's a good chance you'll find a SANDVIK steel that will suit your requirements exactly.

SANDVIK cold-rolled high carbon strip steel is available:

- Precision-rolled in thicknesses to fit your requirements.
- In straight carbon and alloy grades.
- [illegible] specific applications.
- Annealed, unannealed or hardened and tempered.
- Polished bright, yellow or blue.
- With square, round or dressed edges.

Ask your nearest Sandvik office for further information or technical assistance.



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Write on your letterhead for your copy today.

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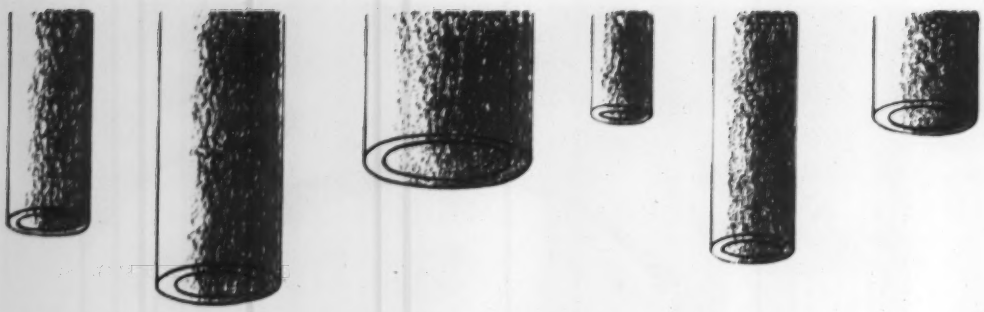
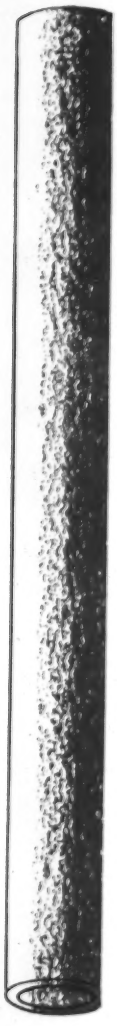
Sandvik Quality Steels





See how much YOU will save when you buy ASARCON BEARING BRONZE in the exact length you need

If you're buying standard 13-inch bronze bars, you have a remnant problem; and that's expensive!

Prove it to yourself. Take your pencil and fill in the blanks below:

TOTAL LENGTH OF PARTS FROM 13" BAR STOCK _____

LENGTH OF SHORT END SCRAP _____

WEIGHT PER INCH OF BAR STOCK YOU USE _____

WEIGHT OF SCRAP PER 13" BAR _____

COST PER POUND OF BRONZE YOU USE _____

COST OF SCRAP PER BAR _____

Now multiply the cost of your scrap by the numbers of bars you use per month and you can see how much short-end scrap is costing you.

If you want to save this money, buy Asarcon Bronze rods, tubes and shapes in exactly the length you need up to 105"; and in any diameter up to 9". Talk to your nearby Asarcon distributor, or write to us directly. We'll be happy to show you how other companies are turning bronze scrap-end losses into profits.

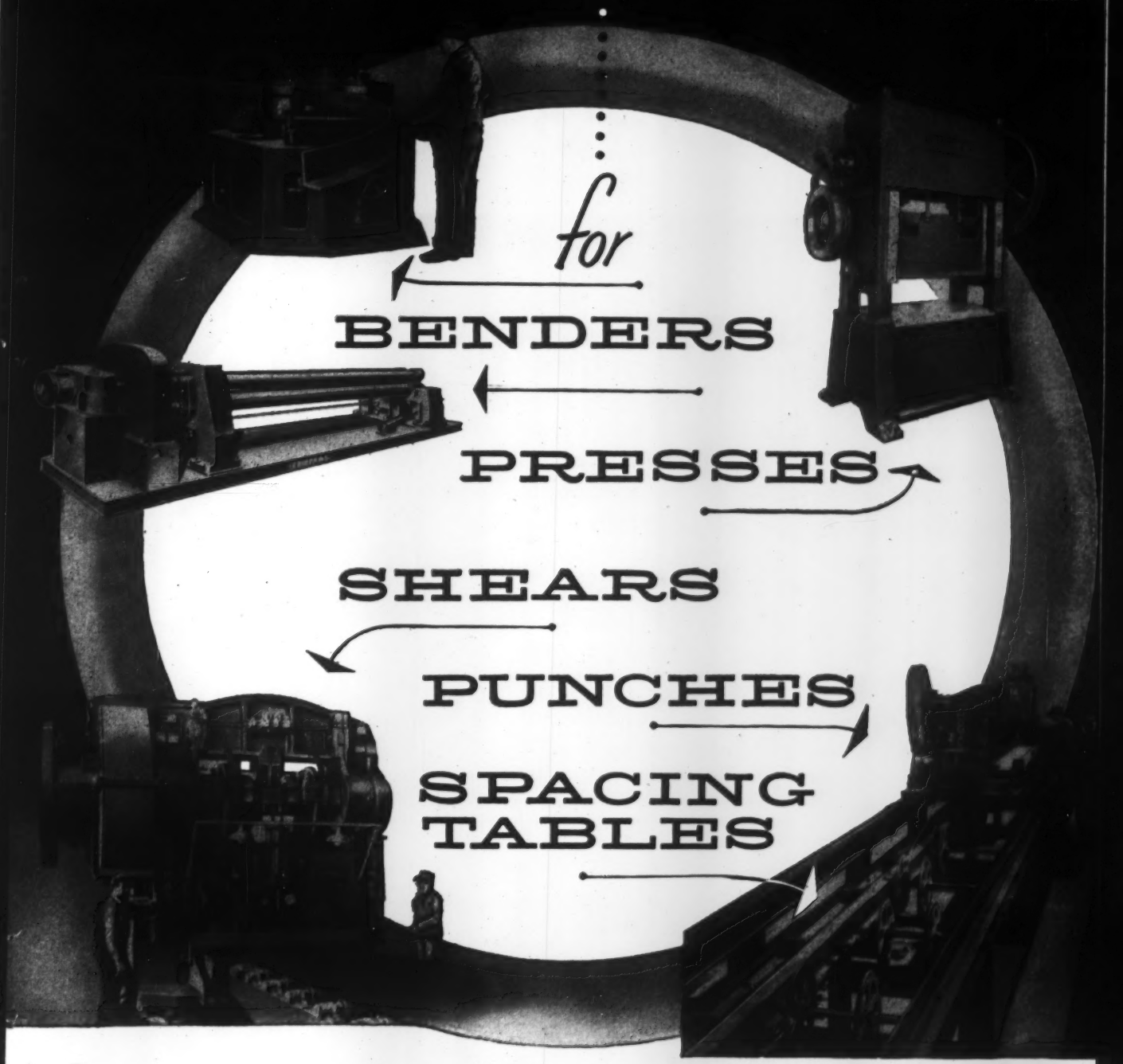
Continuous-Cast Products Department

AMERICAN SMELTING AND REFINING COMPANY

Perth Amboy Plant, Barber, New Jersey • Whiting, Indiana
WEST COAST SALES AGENT: Kingwell Bros. Ltd., 457 Minna Street, San Francisco
IN CANADA: Federated Metals Canada, Ltd., Toronto and Montreal

ASARCO

THE TREND IS TO THOMAS



In steel mills, car shops, structural and bridge works, and general fabricating plants . . . there you will find Thomas machinery doing the job faster and better!

Every Thomas punch, spacing table, bender, shear or press is sturdily built for dependable performance, designed for production economy and available in various sizes and tonnages.

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MACHINE MANUFACTURING CO.

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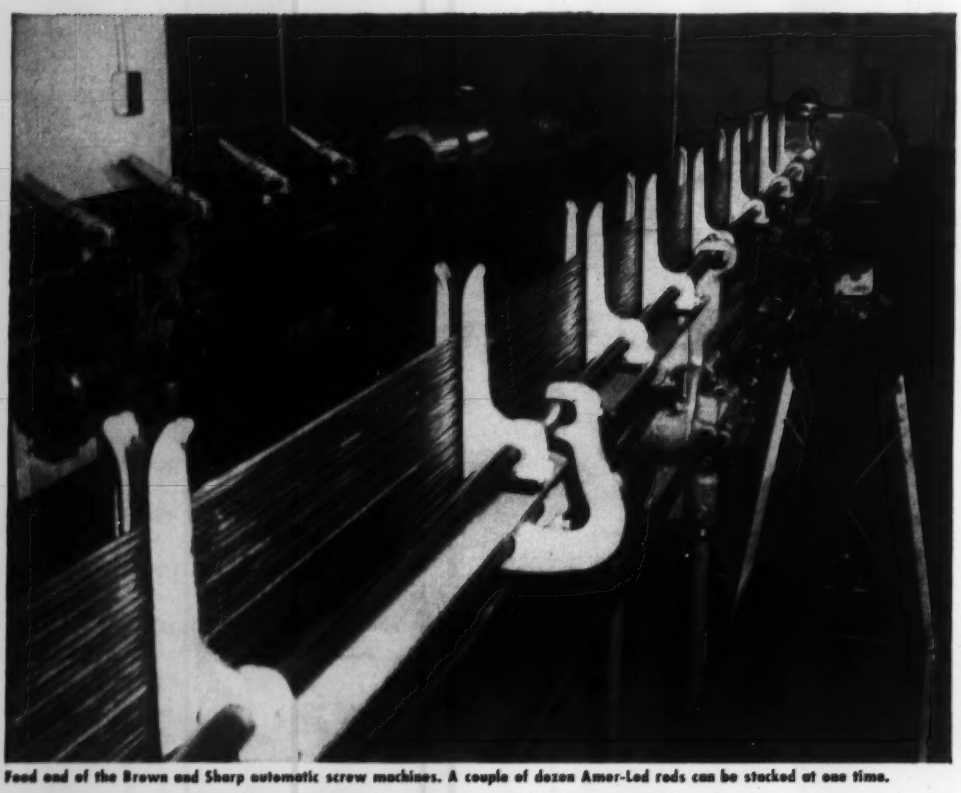
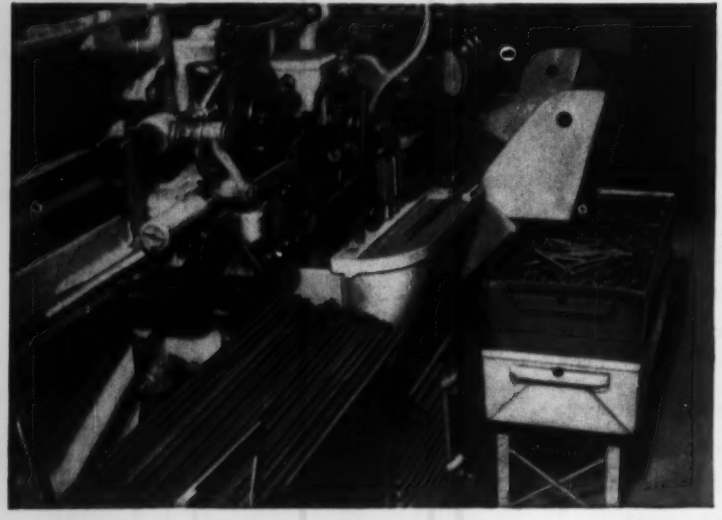
How "MASTER" put a

USS Amer-Led hikes



Feed end of the Brown and Sharp automatic screw machines. A couple of dozen Amer-Led rods can be stacked at one time.

Business end of the screw machines. Increased production was most noticeable here, where shackles are cut, formed and drilled.



Broaching is performed on this Zeh and Hahnemon toggle press. Tool life is much greater since use of Amer-Led.

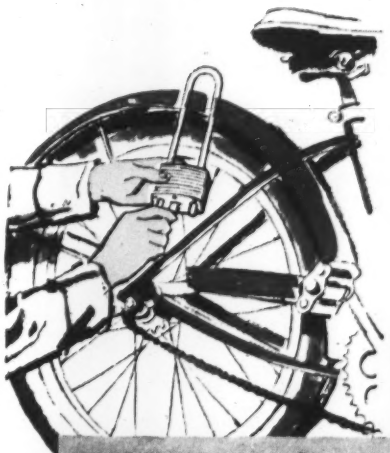
padlock on costs...

production 25% to 75%

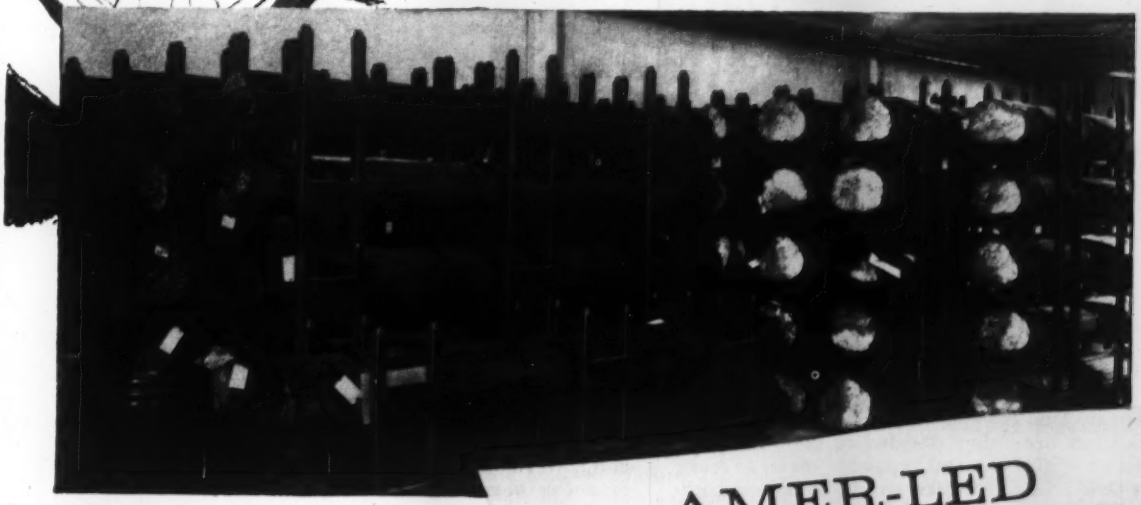
When American Steel & Wire first developed Amer-Led free machining stock, it was suggested to Master Lock and it worked like a charm. Automatic screw machine production leaped 25% to 75% without any increase in tool wear! The finer grain structure of this new steel permitted more accurate cutting to closer tolerances, and there were fewer rejects, too.

Punch press production increased 15% to 20%, and was limited only by the ability of the operator to feed the machine. Although production was not increased in the broaching operation, tool life was increased.

Of course, this is the story of Master Lock Company. If *you* yearn for results like this, then get in touch with your AS&W representative. Ask about USS Amer-Led.



Schoolboys can identify a "Master" padlock with its unusual laminated steel case. The shackle is possibly the most important part. Miscreants try to twist it off with a crowbar, or sever it with hacksaw or rasp. Obviously, the shackle must be hard and free from brittleness after heat treatment; and during production it must be ductile and machinable.



The Amer-Led is stored as received—in steel strapped bundles. There's a type for most machining operations.

AMERICAN STEEL & WIRE
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GENERAL OFFICES: CLEVELAND, OHIO
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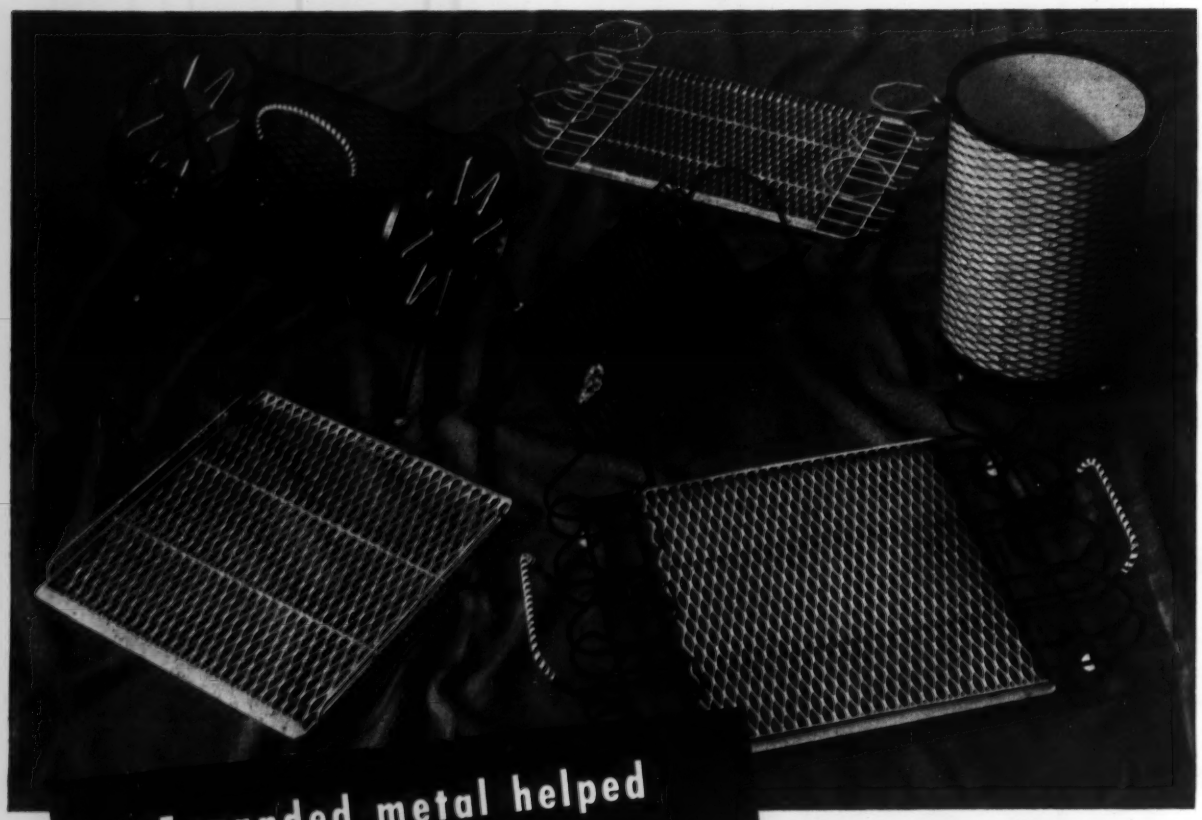
AMER-LED
SUPER-MACHINING
BARS

USS

UNITED STATES STEEL



Expanded metal helped make these products an OVERNIGHT SUCCESS

(Can it do the same for you?)

Six products manufactured by Artistic Wire Products Co., East Hampton, Conn. The attractive modern design is achieved by the use of ½" Penmetal flattened expanded carbon steel, combined with wire frames and sheet metal edgings. Tray items are brass plated.

It happens all the time. Somebody gets an idea . . . applies it to expanded metal . . . and turns up with a new, stronger, better looking, more salable product.

Take the case of Artistic Wire Products Company, East Hampton, Conn. Basically a wire fabrication firm, they decided to combine their operation with Penmetal expanded metal to make some new products, which would be both decorative and utilitarian. The first of these items was brought out about two years ago—and sold at a price within reach of almost any pocketbook. Result: Immediate consumer response! In fact, sales were so encouraging that five other items were soon placed on the market.

These popular products demonstrate the possibilities in expanded metal. Made of sheet steel which is slit and stretched from one to ten times its original width, expanded metal is up to 80% lighter than solid sheet of the same dimensions. The diamond truss pattern adds strength and rigidity, yet permits free passage of light and air. What's more, it is surprisingly low in cost.

So, when you are wondering how to produce your new product, or give an old one a boost, don't overlook Penmetal expanded metal. *It can give you new products, new markets, and new profits.*

PENN METAL COMPANY, INC.

General Sales Office: **40 Central Street, Boston 9, Mass.**
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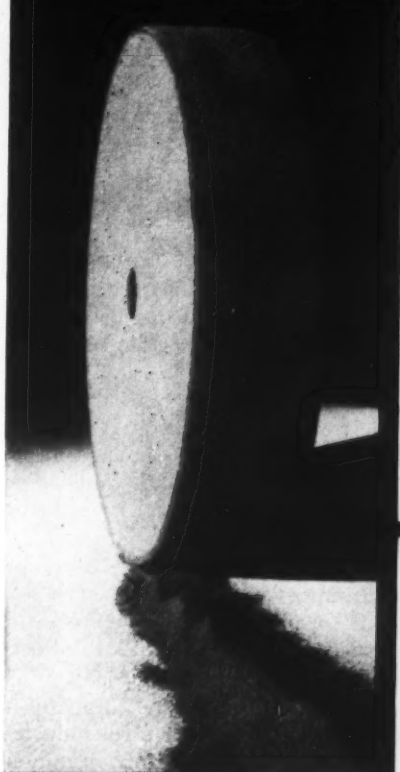
Penmetal

PM-113

You polish with the "Touch of Gold" when your wheels or belts are coated with ALUNDUM B abrasive. This extremely hard, sharp grain cuts fast, clean and cool. And the Norton special high capillarity treatment means easier wetting with cement or glue — for maximum adhesion, longer wheel life and better polishing performance.

More, and better, polishing with every set-up

ALUNDUM B abrasive brings the cost-cutting, value-adding "TOUCH OF GOLD"*



Norton *ALUNDUM B* abrasive consists of grains of uniform blocky shape. No flats, slivers or undersize grains to loaf on the job. No oversize grains to mar surfaces. Made in all grit sizes, from 20 through 240, to cover the widest range of polishing operations.

Ask Your Norton Distributor for the booklet "Setting Up Metal Polishing Wheels and Belts." Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., div. of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

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G-310

NORTON

ABRASIVES

Making better products... to make your products better

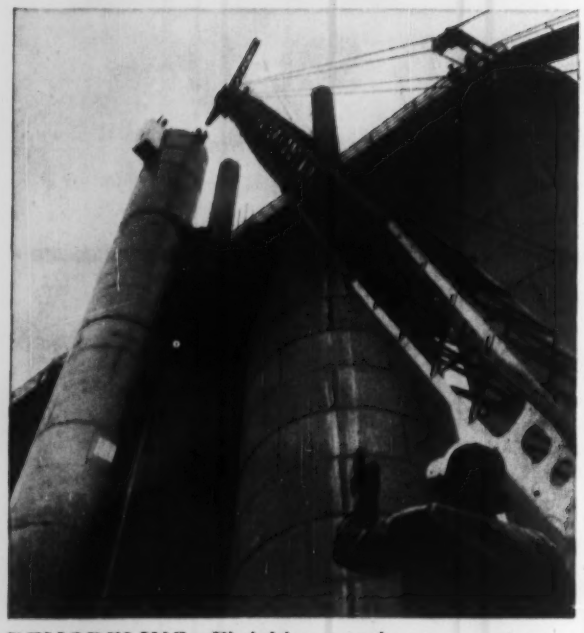
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones Behr-cat Tapes

▲ SHOWN BEFORE completion, this new battery of coke ovens has since boosted Pittsburgh Steel Company's coke production 25 percent.

◀ LIGHTING UP—Lighted taper signals new battery is ready to be warmed up for early operation on a full scale.

New Coke Ovens, Improved Blast Furnaces Spell More Progress at Pittsburgh Steel



REMODELING—Finishing touches are put on a major job which completes blast furnace modernization program.

(Advertisement)

Less than 10 months after plans were first announced, Pittsburgh Steel Company increased coke production by 25 percent and finished modernizing its blast furnace capacity.

The first charge of coke came early this summer from a new battery of by-product ovens at Pittsburgh Steel's Monessen, Pa., Works. At the same location, construction crews were putting finishing touches on a blast furnace improvement project which gives Pittsburgh Steel fully modern iron-making facilities.

These two projects are among five in a 15 million dollar expansion and improvement program, the second for Pittsburgh Steel since 1950. The first—the Program of Progress—was even larger at a total cost of 65 million dollars.

Pittsburgh Steel's program places the company in the forefront of a billion dollar a year steel industry growth program. From the 128 million tons of annual ingot capacity at the end of 1955, the industry will grow to 143 million tons at the end of 1958. That's an 11 percent increase in three years. Pittsburgh Steel's 14 percent expansion is to be completed in half the time. Eighty percent of it will be operating at year's end, the remaining 20 percent will be concluded by the end of 1957's first quarter.

A new welding machine for producing heavier gages of wire mesh and fabric began operating in May. Capable of turning out widths up to 96 inches, the new machine sharply diversifies Pittsburgh Steel's welded mesh and fabric product lines. It can handle wires from ¼ inch to ½ inch in diameter.

In addition to these three phases, the current program includes a major open hearth project and improvements in the company's primary rolling facilities.

Any one phase—or all of them together—are guarantees to thousands of customers that Pittsburgh Steel is a dependable source of quality steel products in a product range greater now than at any time in the company's half a century of business.

Whatever your steel needs—hot and cold-rolled sheet and strip, cold-rolled coated and plain strip specialties, wire products from merchant trade to fine wire specialty grades, seamless tubular goods—YOU CAN DEPEND on Pittsburgh Steel, the quality of its products, the depth and reliability of its service.

A member of Pittsburgh Steel's nationwide sales engineering staff is as close as your telephone. He's ready and more than willing to discuss your steel needs.

ONLY YESTERDAY—This is the site of the new coke oven battery as it looked only last fall when new modernization program was getting underway. Pittsburgh Steel completed job in less than 10 months.

OPEN HEARTH IMPROVEMENTS MOVED FAST —Here's the before and after in the Pittsburgh Steel Open Hearth Department. Above is an open hearth furnace undergoing extensive remodeling. The inset shows the same furnace pouring its first heat of steel after it was placed back in operation.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pennsylvania

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
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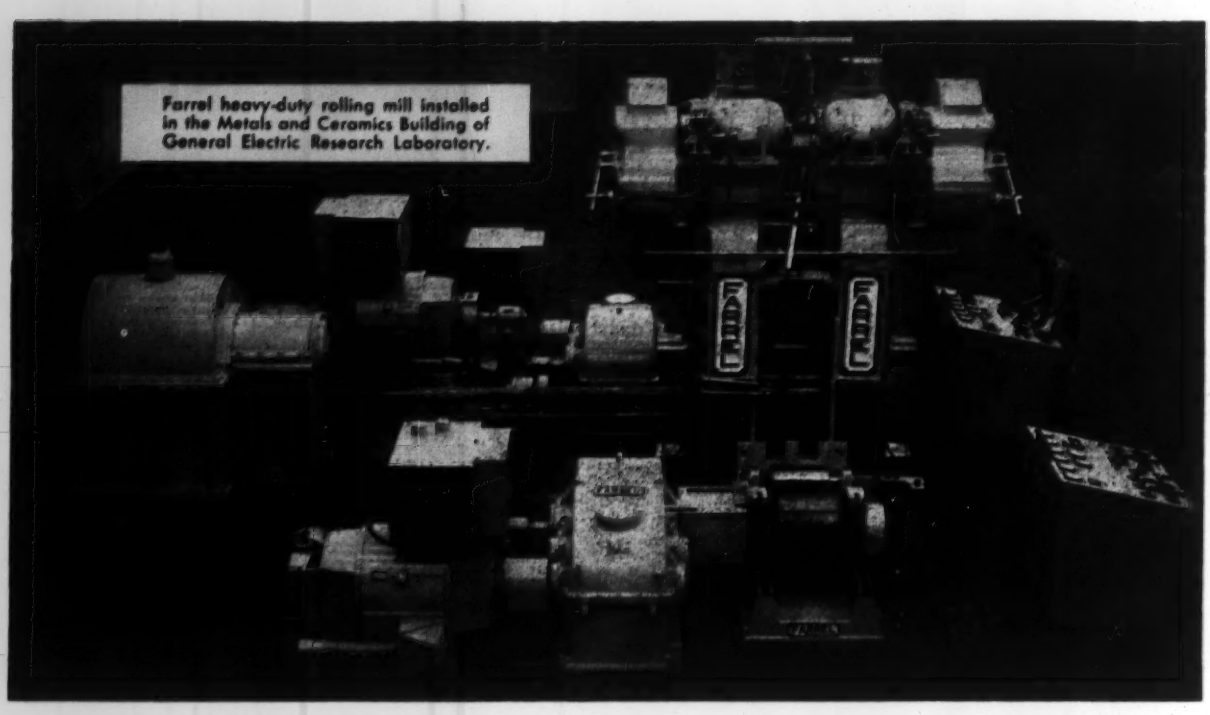

Farrel heavy-duty rolling mill installed in the Metals and Ceramics Building of General Electric Research Laboratory.

This hot or cold reversing mill was designed for rolling super alloys

The Farrel® mill illustrated above was specially designed for rolling a variety of the super alloys currently in demand, as well as even tougher metals which may be developed.

On trial runs it has given a good account of itself, with close gauge control. Factored for extreme rigidity and strength, the mill has a number of features which give it unusual versatility. A few of these are described at the right.

A Farrel mill can be built to meet your specific needs. Just tell us your requirements, and one of our engineers will be glad to discuss your problem with you.

In the meantime, send for a copy of bulletin 273. This 36-page book illustrates the broad line of Farrel rolling mills.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Akron, Chicago,
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FARREL METAL WORKING MACHINERY: Rolls • Rolling Mills • Slab, Rod and Strip Handling Equipment • Roller Tables • Rod Coilers • Slitters • Gears • Gear Drives of Any Capacity • Mill Pinions • Pinion Stands • Universal Mill Spindles • Flexible Couplings • Roll Grinding Machines • Roll Calipers • Hydraulic Presses for Extruding, Forming, Drawing, Forging, Trimming, Hobbing, Straightening and Bending.

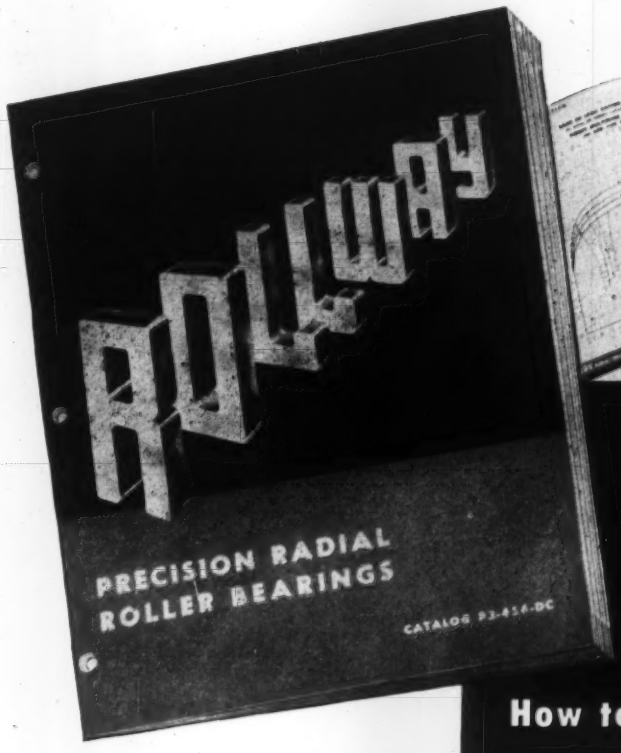
MILL FEATURES

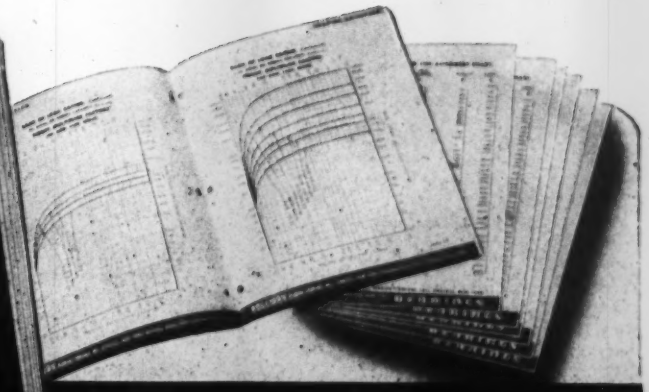
Designed to operate as a 2-, 3- or 4-high reversing mill, for either hot or cold rolling, the entire unit is controlled from either of two pulpits. Power is supplied through a Farrel combination drive and pinion stand. Two direct-current motors, electrically synchronized, drive the rolls. Speed adjustment is by stepless speed variators; no matching of roll diameters is required.

For operation as a 4-high mill, a pair of 3" or 6" diameter by 16" face work rolls are used; backup rolls are 21" diameter. For 2-high operation, rolls up to 24" diameter can be accommodated. For 3-high operation, either a 3" or 6" work roll can be used. In the 4-high arrangement, provision is made for driving either the work rolls or backup rolls.

The mill has high-speed screwdown to facilitate roll changing and for roughing; and slow-speed screwdown for fine adjustment when finish rolling.

For roll changing, a porter bar is supplied for the work rolls, and an integral roll sled for the backup rolls. Tension winders provide 20,000 lbs. tension.





NEW Rollway Catalog & Engineering Data Book

Chock-Full of Useful Information on How to Select ROLLER BEARINGS

- **Reflects latest RBEC* standards and formulas, PLUS the latest research of Rollway engineers.**
- **Contains the following important data on precision radial roller bearings . . .**

CAPACITIES Detailed information on radial static capacities, radial dynamic capacities, and thrust capacities of cylindrical radial bearings.

Thrust capacities and radial dynamic capacities are given separately. Thrust load does *not* reduce radial capacity nor life expectancy of bearing: It is not necessary to calculate an "Equivalent Radial Load."

APPLICATIONS Load ratings, radial internal clearances temperature allowances, provision for float, alignments, seals, lubrication, etc. . . . all are thoroughly covered, supplemented by engineering drawings of typical applications.

NOMOGRAMS The RBEC* formula is here converted into simple nomogram charts, eliminating complicated selection procedures. You can find in seconds the proper bearing for your application.

PRECISION TABLES Detailed data shows the tolerances achieved with varying degrees of precision. Complete tables include limits for shaft diameters and housing bores to obtain proper type of fit of inner and outer races for various operating conditions.

*Roller Bearing Engineers' Comm.—Anti-Friction Bearing Mfrs. Assn.

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Included with the new Rollway handbook-catalog are extra copies of the nomogram charts. Send for yours today!

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Please send free copy of your new handbook-catalog with extra nomogram charts.

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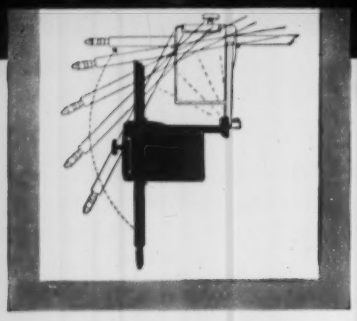

New Airco Model C Heliweld automatic head operates at all angles from horizontal to vertical.

Airco introduces New Automatic Heliweld Head for long-run production welding

The Model C Heliweld automatic head is specifically designed for long-run production on regular or irregular contours — aluminum tubing, motor stators, irregularly-shaped pressure vessels. Its prime advantage is that once the required arc length is set the head will automatically maintain this distance by moving the holder up or down to follow the contours of the work piece. Other benefits are:

- **Versatility** — unit provides good arc voltage control using either argon or helium shielding gases or mixture of both.
- **Adaptability** —the head can be operated at all angles from the horizontal to the vertical (normal) position. The maximum raise-lower distance of the electrode holder is a full 16".
- **Flexibility** — the assembly can be used for AC or DC welding, with or without filler wire. Electrode diameters range from .020 to ⅛".

The use of the new automatic head will be required where welds of consistent dimensions and quality are important and where good weld appearance is necessary or where welding specifications are very high for the electrical, aircraft, and refrigeration industries. Complete information covering the wide range of applications and detailed specification data is available. Write Airco at the first opportunity.

AT THE FRONTIERS OF welding PROGRESS YOU'LL FIND . . .

AIRCO®

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Products of the divisions of Air Reduction Company, Incorporated, include: AIRCO — industrial gases, welding and cutting equipment, and acetylenic chemicals • PURECO — carbon dioxide, liquid-solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide •, COLTON — polyvinyl acetates, alcohols, and other synthetic resins.

MEMO TO: *You*

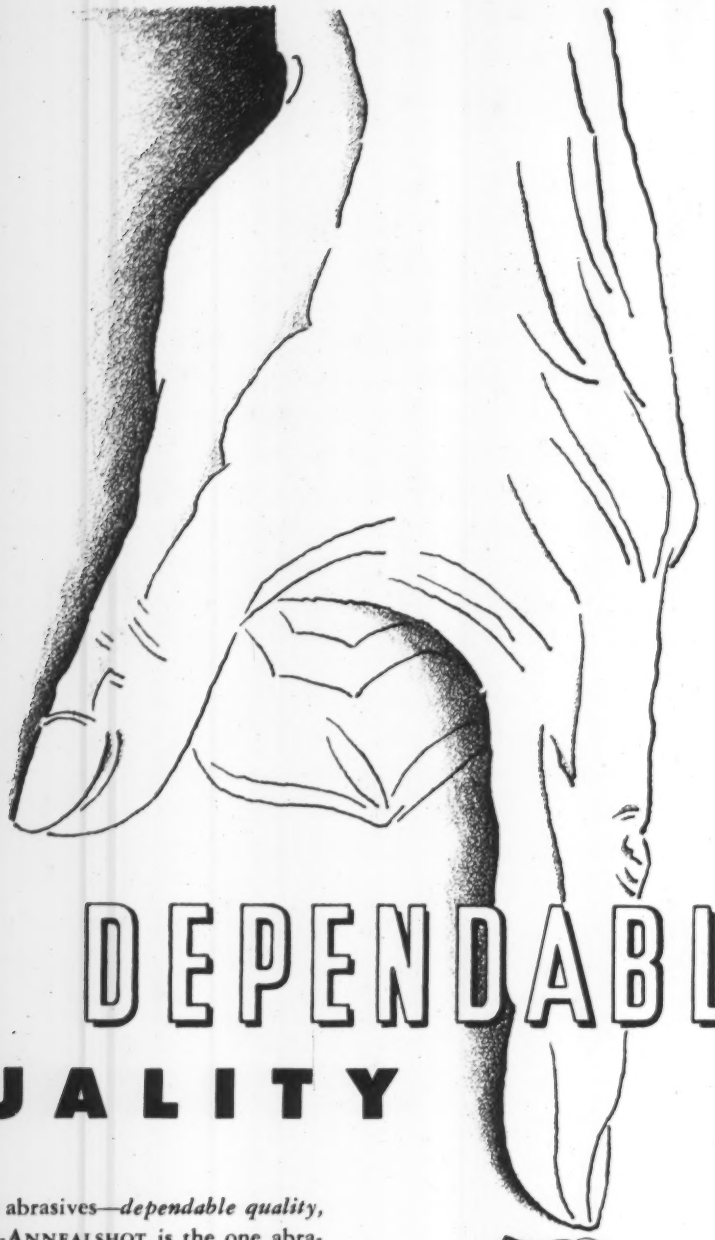
YOU MIGHT AS WELL try to count the beans in a carload as the number of parts that are made of Roebling High Carbon Specialties, Flat Wire and Spring Steel. These Roebling products are unsurpassed for mechanical and dimensional uniformity . . . for speeding manufacturers' production and cutting costs.

Next time you order cold rolled high carbon wire or spring steel specify Roebling. Strictly on its performance you'll probably become a steady customer from then on. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 GRAHAM BLVD. • TULSA, 221 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N.Y.



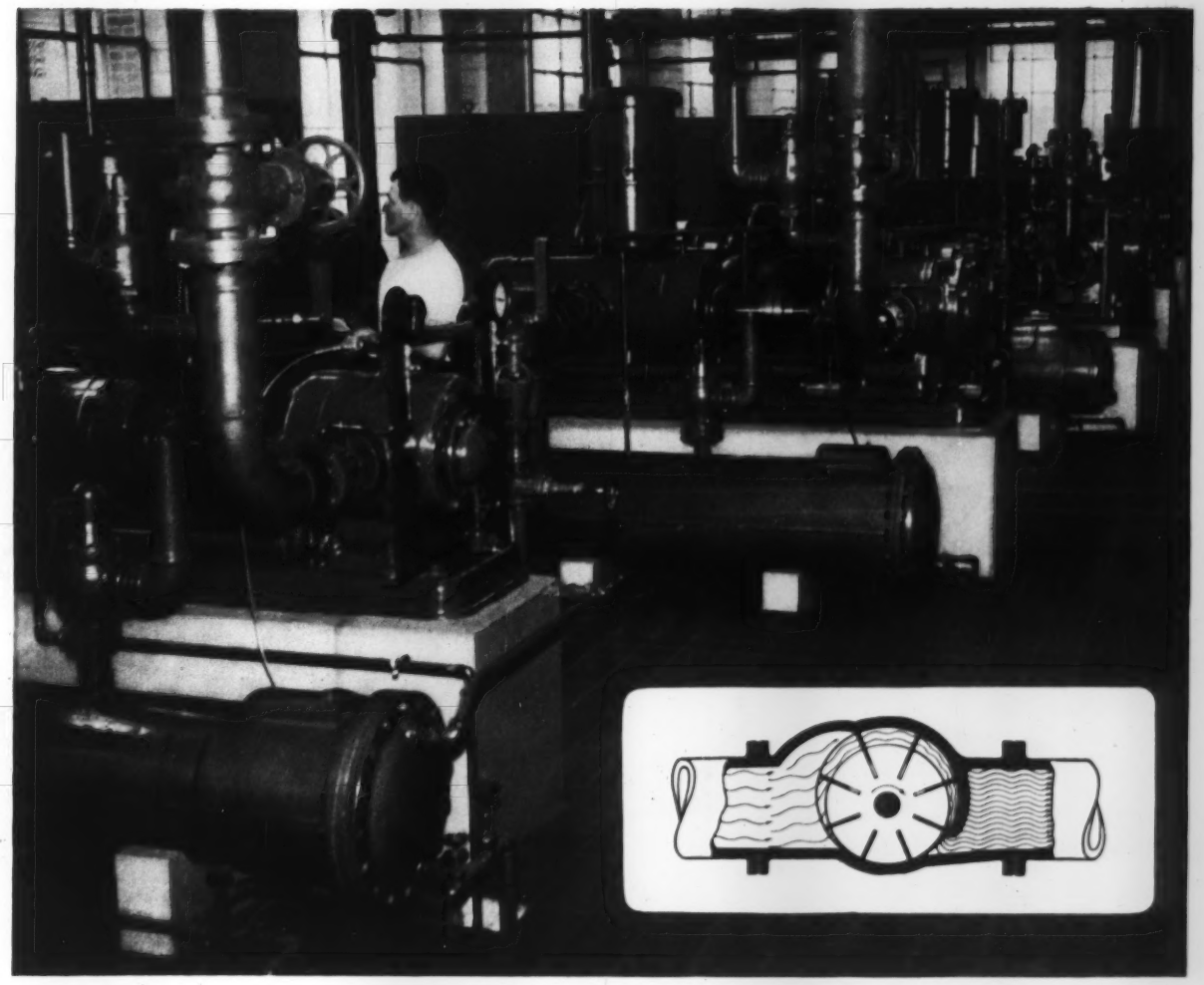
DEPENDABLE QUALITY

When it comes to quality in abrasives—*dependable quality*, that is—Metal Blast's SUPER-ANNEALSHOT is the one abrasive that's really pointed out! It's the finest malleableized abrasive that modern production methods ever developed. We use the best of raw materials, heat treated in automatic, scientifically-controlled furnaces. And we make a good deal of this good shot and grit, for a lot of good customers—so that mass production keeps prices low. When you're ready to buy—give SUPER-ANNEALSHOT a try. You'll be glad you did!

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO

PRODUCING THE FINEST CHILLED AND MALLEABLE SHOT AND GRIT ON THE MARKET



Industrial Pressures Up To 125 psig
Capacities to 3300 cfm

When you need such performance, it will pay you to specify Fuller vane-type Rotary Compressors. They provide the simplest, most economical and most reliable source of compressed air for all pneumatic plant services.

These compressors have a minimum number of moving parts, (rotor, blades and bearings) employ direct-connected motor drive, and operate with an incredible lack of vibration. They run for days without requiring operational attention, and are ideal for continuous service in out-of-the-way locations.

Detailed information on design characteristics, and typical applications will be forwarded promptly on request.

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FULLER COMPANY, 160 Bridge St., Catasauqua, Pa.
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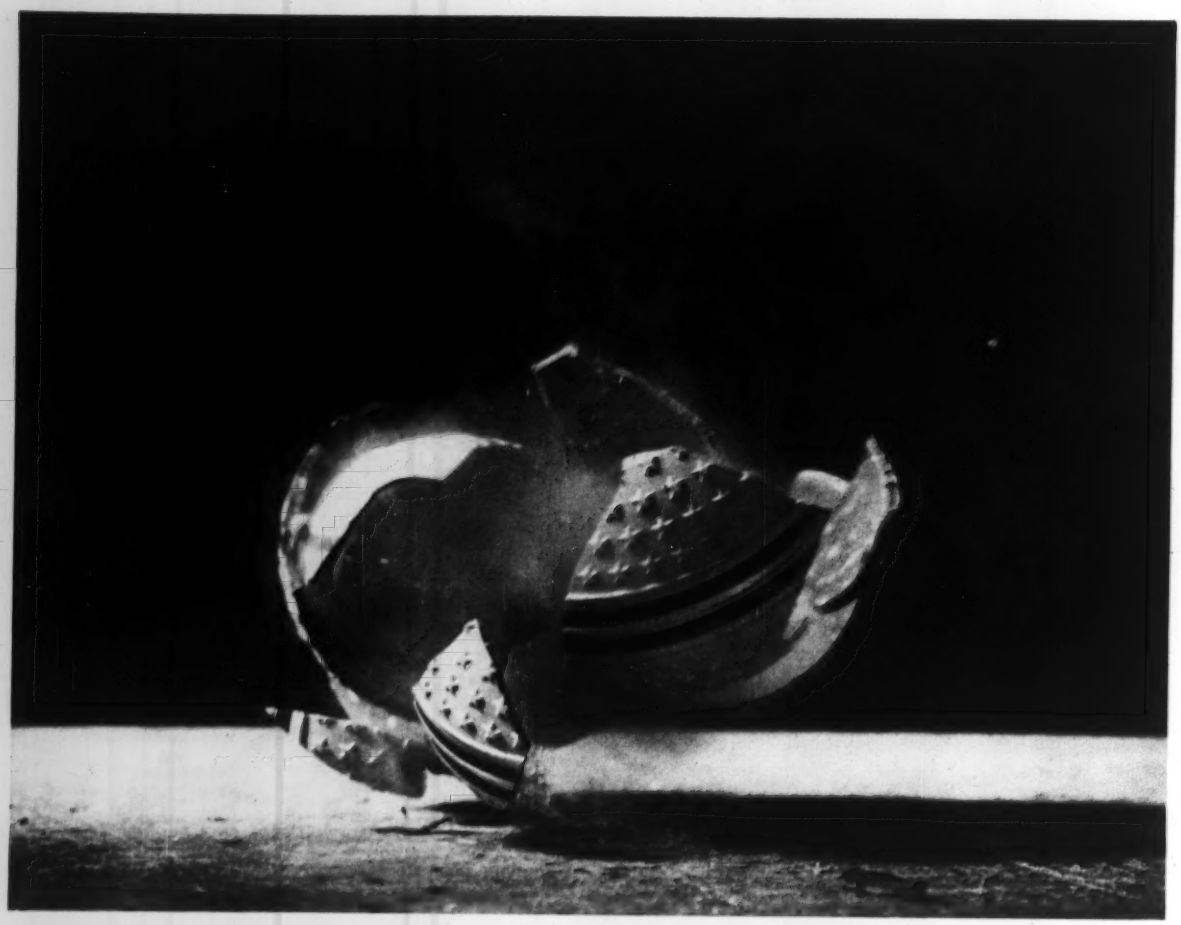


A child's rubber ball, chilled to —320° F., shatters when dropped. Electronic flash tripped by microphone 1.035 milli-seconds after contact. Photographed by Ralph Bartholomew, Jr.

When rubber shatters like pottery...

It happens right before your eyes. Still you can hardly believe the fantastic things that take place at deep sub-zero temperatures.

Rubber breaks like a clay flowerpot. Mercury freezes so hard you can hammer nails with it. Hammer a frozen orange with it, and the chips of fruit fly off like bits of granite. The very air itself turns into a bluish liquid that pours like boiling water.

You feel as if you had awakened in some dizzying space-man world. And when you see metals like tough structural steel crack up under a blow as if they were glass, you realize the puzzle confronting men who have to work with temperatures reaching down into the depths near Absolute Zero.

An oxygen vaporizer, for example, has to withstand a bursting pressure test of more than two tons per square inch at —300°F. A helium liquefier works at 455° below zero Fahrenheit.

How in the world do they make equipment to stand such pressures and temperatures without breaking up or bursting?

Strangely enough, the practical answer to this difficulty is an easy one: INCO Nickel Alloys. One of the many peculiar advantages of nickel alloys is the fact that these sub-zero temperatures have little or no effect on their inherent toughness and ductility. They simply become still stronger.

(By the way, if you would like more data on this subject you are welcome to a copy of "High Properties at Low Temperatures" by our Director of Technical Service.)

The point is, maybe you are being bothered with some metal problem in your product or plant that would be just as easy to solve with one of these INCO Nickel Alloys. The first step is to outline the trouble and send it along for study to The International Nickel Company, Inc., 67 Wall St., New York 5, N. Y.

INCO TRADE MARK

INTERNATIONAL NICKEL

Nickel Alloys Perform Better, Longer

STEEL
September 17, 1956

Metalworking Outlook

Action in Upper New York State

Big industrial developments are stirring in upper New York State, chiefly because of the St. Lawrence Seaway. Reynolds Metals Co. is acquiring 1500 acres of land near Massena, N. Y., in the St. Lawrence river area for a proposed aluminum reduction plant, which could cost $100 million. U. S. Steel Corp. is considering the purchase of property on the shore of Lake Ontario near Lockport, N. Y., for development of a harbor and a sizable plant to process iron ore from Quebec. A corporation spokesman says U. S. Steel has neither purchased nor optioned any property in the district but the area "may have been examined by corporation engineers."

Memo on Fast Write-Offs

The Defense Mobilization Board meets Wednesday, Sept. 19, in the first of a series of conferences on whether to grant fast tax amortization for steel expansions. A decision won't come before mid-October. As of late last week, seven steel companies had applications for five-year write-offs on file for projects that would cost $858.8 million (see page 134). U. S. Steel had filed for a program to cost $455.2 million; Jones & Laughlin Steel Corp. for $250 million; Kaiser Steel Corp. for $65 million; Inland Steel Co. for $40.9 million; Youngstown Sheet & Tube Co. for $24.3 million; Detroit Steel Corp. for $16.4 million; Alan Wood Steel Co. for $7 million.

Shopping List for Mill Equipment

August Thyssen-Huette A.G., German steel producer, is preparing a giant shopping list to be filled by U. S. mill equipment builders. It has been granted a $10-million Export-Import Bank loan (page 103). The company needs a semicontinuous billet mill, a bar mill, auxiliary equipment for a cold-rolling mill, an electrolytic tinning line and a galvanizing line.

Ore Fleet: In Action Again

The Great Lakes iron ore fleet is operating at full force for the first time since July 1. Shenango Furnace Co.'s three boats and Midland Steamship Co.'s five vessels began running last week following a settlement with the Marine Engineers Beneficial Association and the Masters, Mates & Pilots Association on terms similar to those granted earlier by U. S. Steel's Pittsburgh Steamship Division. Beginning Sept. 20, engineers and mates of Bethlehem Steel Corp.'s lake fleet of 11 boats will vote in a bargaining election to decide whether they want representation by the two unions. The labor group is pressing for elections with other fleet operators.

Operation Mop Up for Steelworkers

This is Operation Mop Up time for the United Steelworkers. Most of the 1500 contracts it holds with companies other than basic steel firms expire in the last half of the year. In the past, the union has always tried to hold closely to the basic steel pattern in its other settlements. Not so,

this year. Supplemental Unemployment Benefits don't appear in many of the nonbasic terms, and the length of contracts varies. But one pattern—size of the wage boost in 1956—is holding at 9 to 10 cents an hour.

Chicago View on Business Weather

Here's how Chicago purchasing agents view the business weather: Deliveries are improving except in steel; prices are higher; inventories are slightly smaller; employment is up, but only a little; production is higher; order backlogs are higher. Chicago steel users stockpiled heavily before the strike and, generally, have adequate supplies, even now.

Notes on Ford

Ford Motor Co. expects its hourly employment to rise 10 per cent over the next four months. The present hourly force of about 127,000 will increase by more than 8000 during the next 30 days, and it may reach 140,000 by the end of the year . . . Ford's medium priced "E" car probably wont makes its debut before late next year.

Diecasting Prospects

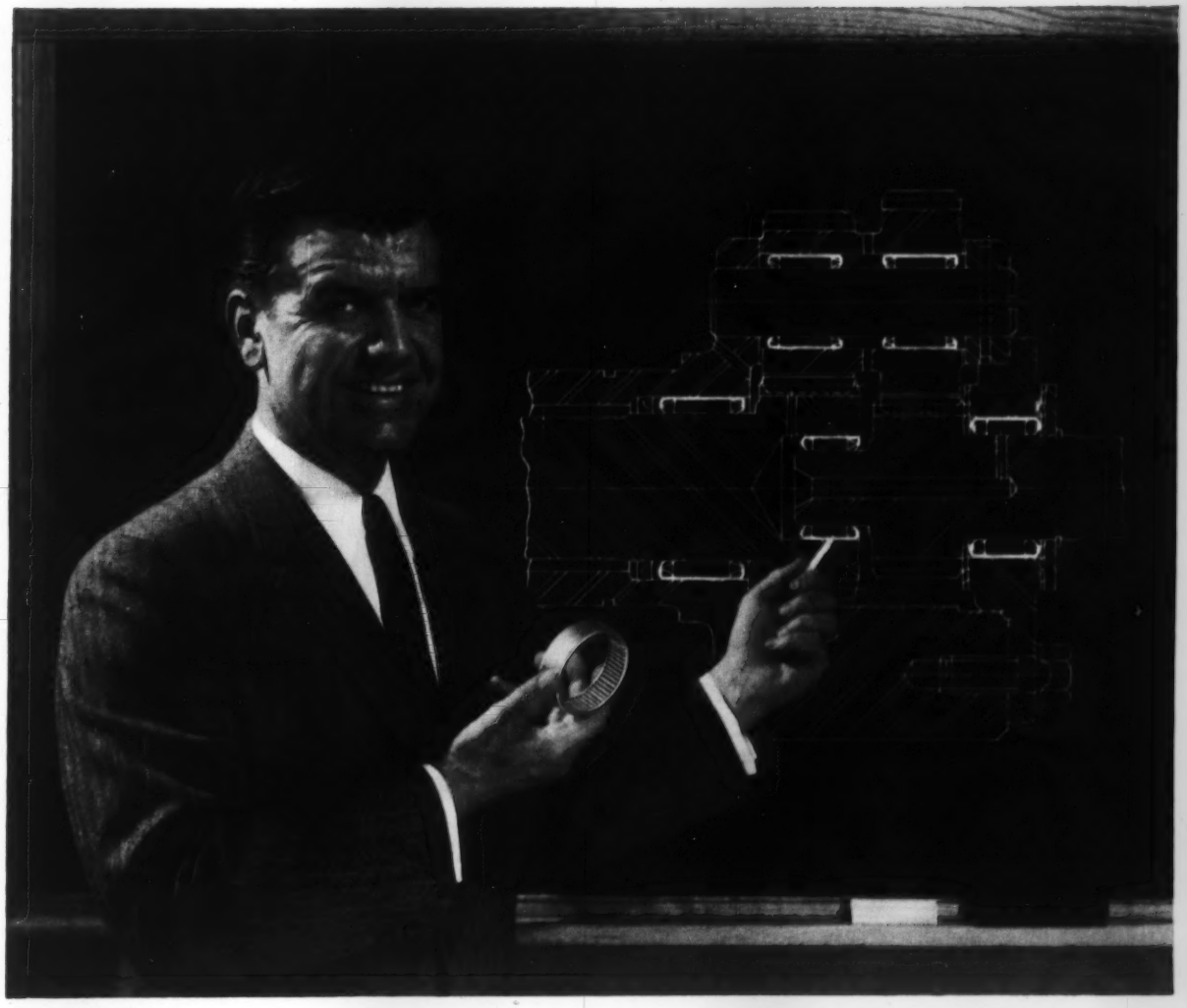
Job shop diecasters will need record quantities of zinc and aluminum in 1957. Delegates to the American Die Casting Institute's meeting in Chicago last week heard that 420,000 tons of zinc for diecasting will be needed next year. That compares with the previous high of 410,000 tons in 1955 and 355,000 tons in 1956. The forecast assumes 1957 production of 6.5 million autos (the principal consuming field for zinc diecastings) and an increased use of castings per car. The use of aluminum diecastings in 1957 will also exceed 1956 by some 40 million lb—to place next year's aluminum needs at 372 million lb, 20 million lb above the 1955 high.

The Search for Engineers

Some 414 industrial and governmental organizations employing about 140,000 engineering graduates expect to boost that number by 10.4 per cent before the end of 1956. Their estimated requirements would call for an increase of 14.2 per cent if the men were available. The transportation equipment industry expects to hire 22 per cent more, but wants 35 per cent more. Makers of professional and scientific instruments expect 15 per cent more, but would take 26 per cent more, points out Dr. Joseph W. Barker, president of American Society of Mechanical Engineers and Research Corp., New York.

Straws in the Wind

On Oct. 1, H. K. Porter Company Inc. will acquire the business of West Virginia Steel & Mfg. Co., Huntington, W. Va., maker of light steel rails, reinforcing bars, hot-rolled bars and semifinished steel . . . Studebaker-Packard Corp. hopes to market 150,000 Studebaker cars and trucks next year, including Canadian and overseas sales . . . U. S. Steel's Benjamin F. Fairless is chairman of a new citizens committee to review America's foreign aid programs.



"It's a perfect spot for a **TORRINGTON NEEDLE BEARING!"**

No one can spot a potential needle bearing application as well as a Torrington engineer.

He will summon the unmatched experience of our Engineering Department to give your product the unique advantages of the Torrington Needle Bearing. And he will draw on our extensive file of previous applications for clues that may help solve your specific anti-friction bearing problems. You can rely on him, too, to review all engineering details so that the application will go into production smoothly and perform satisfactorily in service.

If high radial load capacity, limited space or unit cost enter into your choice of a bearing, chances are you should consider a Torrington Needle Bearing. We may be able to add your product to the thousands which have enjoyed the benefits of this unique bearing.

See our New Needle Bearing Catalog in Sweet's Product Design File—or write direct for a catalog.

TORRINGTON NEEDLE BEARINGS
Give you these benefits

- low coefficient of starting and running friction
- full complement of rollers
- unequalled radial load capacity
- low unit cost
- long service life
- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts

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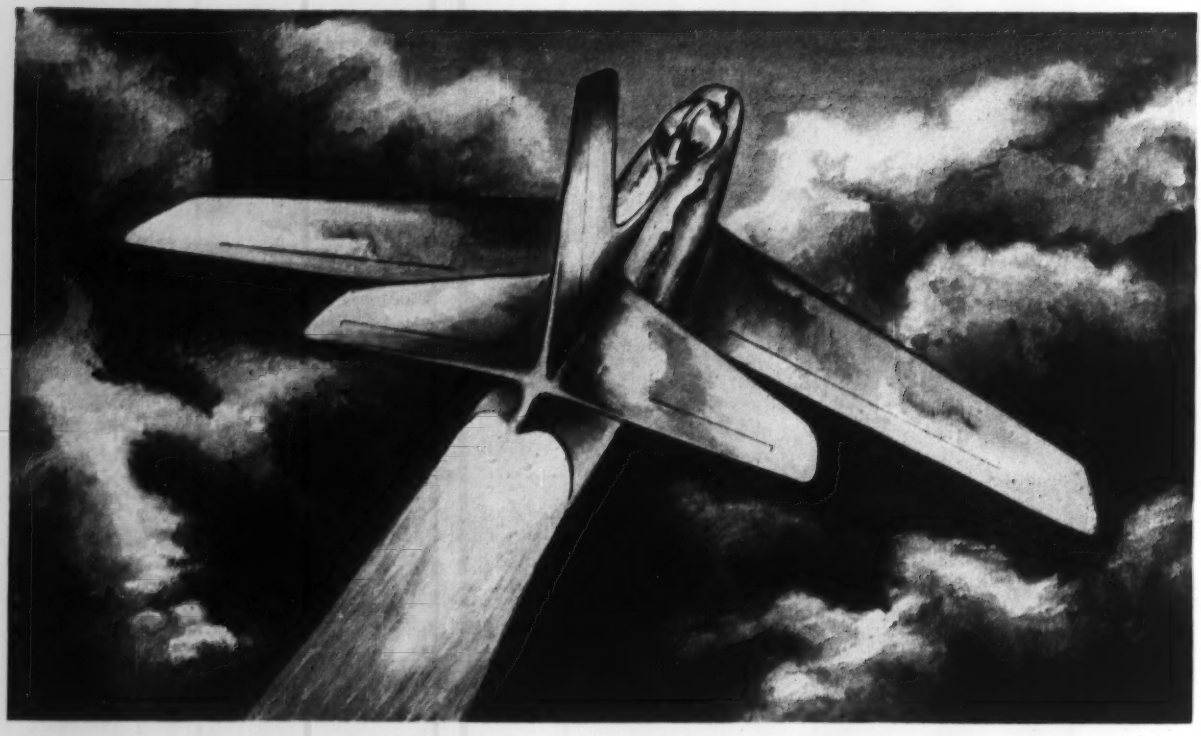


Armco Stainless in Jet Engine Spark Plugs

Fights Heat, Machines Better, Costs Less

Free machining "stabilized" Armco Stainless Steel bar stock replaced a high-nickel alloy in this right-angle jet engine spark plug. Here are three reasons why Armco 18-10 Cb-Ta FM Stainless Steel was chosen for the barrel around the ceramic:

1. **It withstands the heat and is stabilized against harmful carbide precipitation.**
2. **The *Armco Stainless Steel bars machine better*—special free-cutting elements are added.**
3. ***It costs less than the metal formerly used.***

Problem Solvers

Looking for a solution to a product-problem? One of the special grades of Armco Stainless Steel could be your answer. Armco's new precipitation-hardening grades, for example, are giving corrosion resistance and extra high strength and hardness to products of many kinds. Extra-low-carbon stainless steels produced by Armco give top protection to weld areas in equipment exposed to corrosive service.

Call the Armco Sales Office near you, or write to the address below for complete information about standard and special grades of Armco Stainless Steel.

Easy-to-machine Armco 18-10 Cb-Ta FM Stainless Steel (Type 347 F) forms the barrel around the ceramic on this jet engine spark plug. It replaces high cost high-nickel alloy. The plug's threaded end is Type 416 stainless; the flange is Type 430. **Photo courtesy Champion Spark Plug Company.**

ARMCO STEEL CORPORATION

2076 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Dynamic Steel

Those who remember the dinky blast furnaces, the wrought iron puddling furnaces and hand sheet mills of a few decades ago will recall that the steel industry was pretty prosaic in those days. The industry had plenty of fortitude, but it made no all-out effort to improve its methods or its products.

How that picture has changed!

Many of the men who are responsible for this renaissance will be in attendance at the annual meeting and show of the Association of Iron & Steel Engineers in Cleveland next week. Thanks to them and men like them, steel has become a dynamic industry in recent years.

Old-time blast furnaces have given way to modern versions with four or five times more capacity. Current improvements in practice have brought coke consumption down, pig iron production up. Even the blast furnace may eventually give way to some new process such as the hydrogen reduction of metallics.

Open hearth and electric furnaces have moved in over the years to replace the extinct puddling furnace. Present-day open hearths and electrics bear little resemblance to the earlier versions. Larger furnaces with provisions for fast charging and the use of oxygen to expedite reduction have contributed to the sharp increase in steel production. The oxygen converter also is finding a place as an established medium for making steel.

The newest automated and electronically controlled cold strip mills, with speeds of 7000 feet per minute, have replaced the obsolete hand rolling mill. The door is opening for continuous casting to play its part in the shaping of steel into finished products.

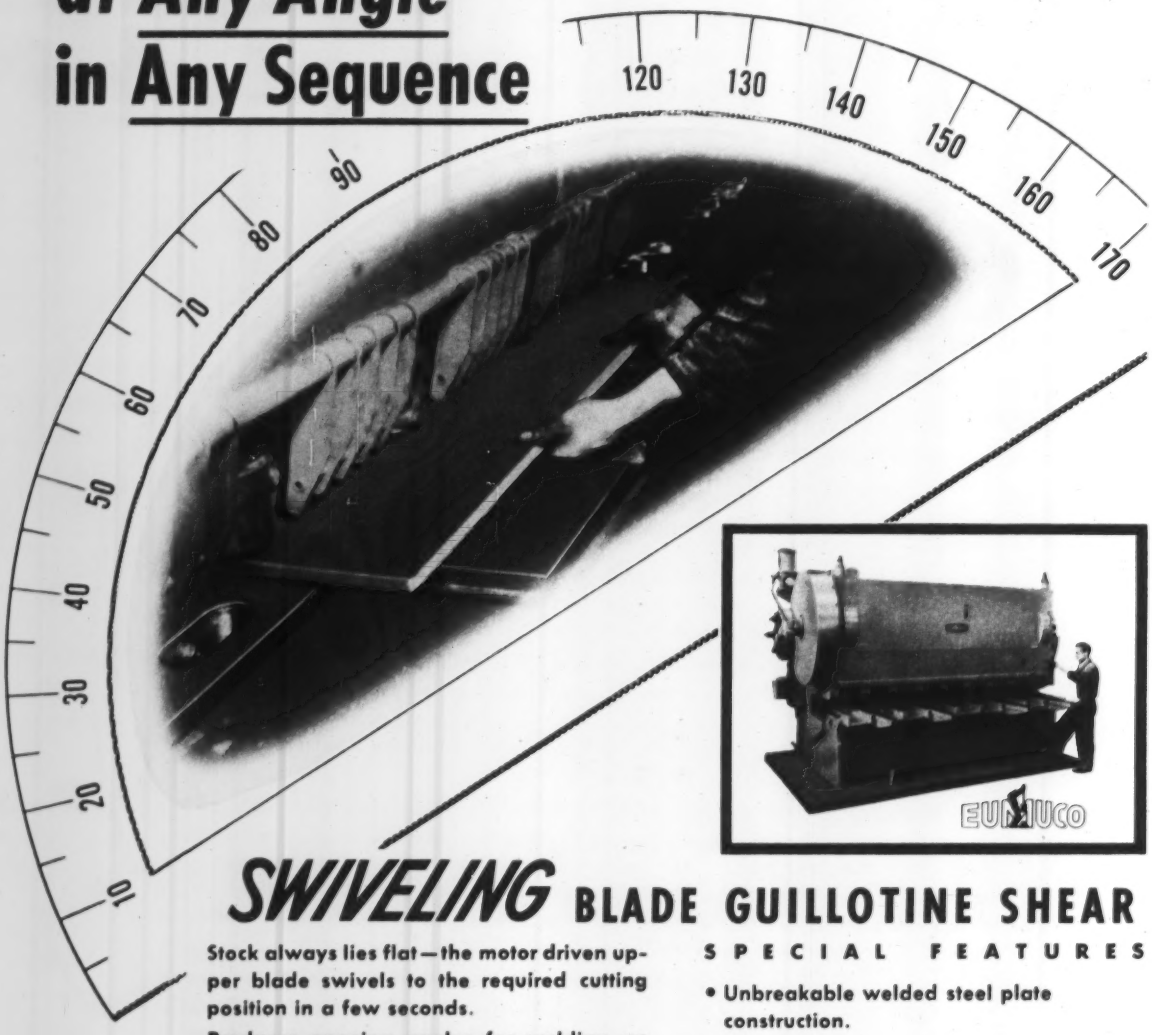
Research has brought forth new steels with properties that would have been believed impossible only a few years ago. The even newer vistas which are being opened up by vacuum metallurgy indicate that we are only beginning to witness the marvels in steel that lie ahead.

Only a few years ago, the steel industry produced only a half ton of steel per capita. It has increased the figure to over three-quarters of a ton, and, in less than two decades, this dynamic industry will be called upon to make nearly a ton per person.

Irwin H. Such

EDITOR-IN-CHIEF

Shear Plate at Any Angle in Any Sequence



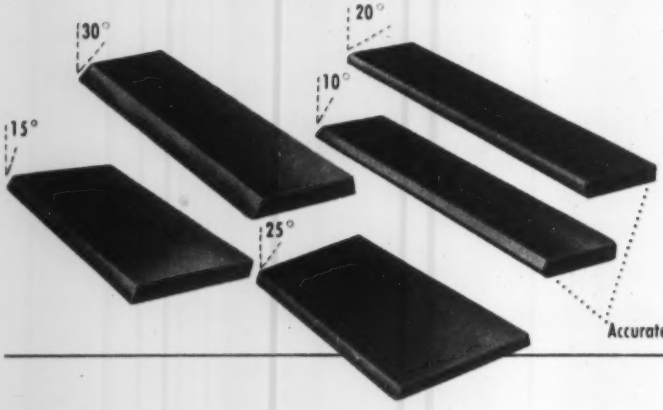
SWIVELING BLADE GUILLOTINE SHEAR

Stock always lies flat—the motor driven upper blade swivels to the required cutting position in a few seconds.

Produces opening angles for welding up to 60°, accurately controlled "lands" and sheared edges that require no machining.

SPECIAL FEATURES

- **Unbreakable welded steel plate construction.**
- **Precision shadow cutting line.**
- **Speeds up to 50 strokes per minute.**



Accurately Controlled Lands

UNITED STATES

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OF GERMANY

ESTABLISHED 1869

GENERAL REPRESENTATIVE

RICHARD E. KLEINHANS
INTERNATIONAL INDUSTRIAL SALES
122 EAST 42nd STREET
NEW YORK 17, NEW YORK

New Plant, Equipment Spending Hits Peak

(Millions of dollars)

	1956*	1955	1954	1953
Manufacturing	15,249	11,439	11,038	11,908
Durable goods industries	7,719	5,436	5,091	5,648
Primary iron & steel	1,274	863	754	1,210
Primary nonferrous metals	418	214	246	412
Electrical machinery & equipment	594	436	439	475
Machinery, except electrical	1,085	809	694	797
Motor vehicles & equipment	1,817	1,128	1,295	989
Transportation equipment, excluding motor vehicles	488	274	191	180
Stone, clay & glass products	707	498	361	346
Other durable goods	1,336	1,214	1,110	1,239
Nondurable goods industries	7,530	6,003	5,948	6,260
Mining	1,237	957	975	986
Railroad	1,321	923	854	1,311
Transportation, other than rail	1,788	1,602	1,512	1,565
Public utilities	5,009	4,309	4,219	4,552
Communications	10,709	1,983	1,717	1,690
Commercial & others		7,488	6,513	6,310
Total	35,313	28,701	26,827	28,322

*Estimated.
Source: Commerce department, Securities & Exchange Commission.

Capital Spending Heads Up

THE U.S. "tight money" policy won't appreciably affect industry's expansion plans.

A spot check of 50 metalworking firms by STEEL indicates they expect to boost their capacity by 16 per cent in 1957 despite the higher cost of borrowing money. Industry in general, of course, won't expand that much, but new plant and equipment spending next year should be comparable with 1956's performance, which will set a record (see table).

Hot Seat—We already have a front seat on a guided missile ride to a $500-billion economy by 1965. Business this year will put out over $35 billion for new facilities. That tops the previous record — $28.7 billion last year—by almost one-fourth.

Outlays in the fourth quarter of this year will be at a seasonally adjusted rate of $38 billion, compared with $31.5 billion in the same quarter of 1955. The new figures are a rousing vote of confidence by business in the continuing strength of the American economy.

Line-Up — Here's how the percentage increases in capital spending stack up (this year compared with last) for these industries: Manufacturing, up 33 per cent; durable goods, up 42 per cent; nondurable goods, up 25 per cent; mining, up 29 per cent; railroads, up 43 per cent; transportation except rail, up 12 per cent; public utilities, up 16 per cent; commercial and other, up 13 per cent.

Average total increase for all divisions of industry is 23 per cent. Spending outlook closely follows predictions made earlier this year, though there have been shifts in some groups. Both machinery groups—especially nonelectrical—have stepped up their plans and expect to spend one-third more than they did last year. Nonferrous companies are almost doubling their 1955 outlays.

Strike Impact—Steel and auto programs have been cut back from early estimates, but are still two-thirds and two-fifths higher than they were last year. Some of the reductions could be caused by the steel strike.

In fact, about the only damper in the plant and equipment buying picture is shortage of materials. Aggravated by the strike, it could prevent some firms from reaching planned goals. After the 1952 steel strike, outlays didn't reach what had been predicted. But 1956 will still end up as the biggest year for plant and equipment to date.

Steel Expands

Acme plans its own mill; Sheffield will boost alloy steel production at Houston

INCREASED capacity and more special steels will result from steel expansion moves just revealed (for long-range plans, see page 134).

Acme Steel Co. hopes to get an early start on the construction of steelmaking facilities near its fabricating plant at Riverdale, Ill. Initial production will be 17,000 tons of semifinished steel a month.

Directors Decide — Acme's directors have decided that the company must build its own facilities for the production of billets and slabs to insure an adequate supply of raw materials at all times.

The same reason is behind its agreement to buy Newport Steel Corp., Newport, Ky. Newport will be operated as a division of Acme, and a part of Newport's annual ingot capacity of 600,000 tons will be barged to the Riverdale plant.

Acme has not been able to buy enough semifinished steel in the Chicago area in times of high demand.

The company believes it can build steelmaking facilities at Riverdale for $15 million "through the fortunate circumstance of acquiring a second-hand blooming and finishing mill."

Acme estimates that it will take at least two years to build the plant once the site is definitely determined. Eventually, the mill may be expanded to furnish all of Acme's needs.

Oxygen Process—Carl J. Sharp, Acme's chairman, says the present plan is to use scrap and pig iron to make ingots with cupola furnaces and oxygen converters.

A Bigger Texas — Officials of Sheffield Steel, a division of Armco Steel Corp., say its expansion project will make Houston the chief source of high strength alloy steel in the central U. S.

Beginning soon: Construction of a 45,000-sq-ft heat treating plant at the Sheffield mill on Houston's ship channel. Facilities will be provided for heat treating, tempering, normalizing and annealing special alloy steel bars and plates.

Sheffield officials point out that this project is the second major step authorized by Armco's board of directors in the last seven months "to meet steel needs of the Southwest's expanding economy."

Large quantities of special steels are needed by the oil, aircraft and other southwestern industries.

Late last year Sheffield set out on enlargements and additions which will increase the capacity of its Houston plant from 1 million to 1.25 million tons a year. Now under way are enlargement of the blast furnace, construction of a second electric furnace and the building of facilities for processing ores and coking coal.

Nickel Shortage Pushes Bart Expansion

Bart Mfg. Corp., Belleville, N. J., has almost doubled its production facilities to aid processing industries which have been hard hit by the nickel shortage. The company uses these machines in which rotating pipes become plating tanks. A special nickel solution swirls within, and electrolytically deposits a smooth, pore-free, ductile lining of pure nickel

Taconite Tempo Up

Reserve Mining Co. dedicates its Davis processing plant at Silver Bay, Minn.

TACONITE became a workaday ore last Thursday when Reserve Mining Co. dedicated its commercial quantity processing plant at Silver Bay, Minn.

Reserve Mining, owned by Armco Steel Corp. and Republic Steel Corp., spent $190 million on its project which mines taconite rock at Babbitt, Minn., and transports it 47 miles by rail to Silver Bay for processing into walnut-size pellets. The pellet is "tailor-made" ore more uniform in consistency than natural iron ore. Where the original taconite rock contained only about 25 per cent recoverable iron, the pellet is about 62.5 per cent iron. Natural Mesabi iron ore is slightly over 50 per cent iron.

In Production—Reserve Mining has been producing taconite pellets in large volume for almost a year. The processing plant, known as the E. W. Davis Works, was designed to produce 3,750,000 tons of pellets a year. By midyear, it had turned out almost 2 million tons.

The Silver Bay processing plant and the Babbitt crushing plant operate all year. Pellets are stockpiled when the Great Lakes are closed in winter.

Other Producers — Other companies are constructing major taconite processing facilities. One of them is expected to be operating next year.

It was predicted at Reserve Mining's dedication that taconite will ultimately replace direct shipping ores from the famed Mesabi range as the principal source of iron ore.

Builders Hardware Shipments

(In thousands of dollars)

1956	$373,656*
1955	355,866
1954	323,511
1953	270,925
1952	250,390
1951	279,270
1947	193,925

*Estimated by STEEL.

American Hardware Corp.

Hardware Quality To Rise

Competitive pricing is a problem, but assembly lines are busy as manufacturers set out to merchandise quality products. A trend to stainless steel is evident

SALES of locks, lock sets, door closers and other builders hardware will set records this year (see table) despite a 20 per cent decline in new housing starts. Commercial, industrial and institutional construction more than balance the loss.

Prices reacted to the steel settlement recently (10 per cent increase on hinges; 6 per cent on cylindrical locks), but the market remains highly competitive.

Changing — The cost of hardware in low priced housing now runs about 0.5 per cent of the total material cost. It used to average about 1 per cent. Higher quality in hardware used in commercial and institutional construction boosts the percentage of total cost in this area to about 2 per cent.

More manufacturers are boosting quality, however, so there's less sensitivity to volume sales at cheap prices. How far the trend will go remains to be seen.

Reports E. H. McCullock, sales manager, Russell & Erwin Division, American Hardware Corp., New Britain, Conn.: "We are designing better hardware for private building. We use more forged and stamped steel and brass, and have developed a drop forged lock case. More stainless is going into cylindrical locks, and we'll be coming out with stainless in mortise lock lines and trim."

First Contact—Says S. B. Wilder, Sargeant & Co., New Haven, Conn.: "The front door lock and latch is the first physical contact one has with a house or building. We are urging builders to improve the quality of builders hardware, and we are meeting with encouraging success."

Sargeant produced the first stainless steel locks and is currently expanding the line. There are indications that polished chrome is giving ground to stainless in some lock designs.

Yale & Towne Mfg. Co.'s Hardware Division, White Plains, N. Y., reports more contracts for stainless installations would have been closed this year but for the steel strike. Yale's contract volume of business this year is 15 per cent above last year's.

Required—About 358,000 tons of steel and nonferrous metals, mostly brass and bronze, are required for the annual production of builders hardware. Those products make up about 35 per cent of all hardware sales. Today, the average six-room house takes about 20 hinges and ten locks or latches.

Newest developments in the field include: Increased use of powdered metal parts and pressure formed aluminum parts; more forged and precision stamped parts.

Apprentice Training Grows

Stepped up promotional activities by employer associations and labor unions helped industry to recruit 17,470 apprentices during the past year. The total is even bigger when you count those not registered.

About 180,000 registered apprentices, says the Labor department's Bureau of Apprenticeship, made up the nation's pool of trainees during the fiscal year which ended July, 1956.

American Smelting & Refining Co.

Where the Lead Goes

(In tons)

	First Half 1956	First Half 1955
Storage batteries	163,000	176,000
Tetraethyl	97,000	80,000
Cable	65,000	62,000
Construction	55,000	53,000
Solder	33,000	37,000
Paint	19,000	19,000
Ammunition	18,500	18,000
Bearing metal (babbitt and other)	13,000	12,000
Type metal	12,500	13,000
Ceramics	12,000	11,000
Brass & bronze ingots	10,000	10,000
Miscellaneous	83,000	87,000
Totals	581,000	578,000

STEEL estimates.

Lead Sales Look Good

Despite lighter battery business through the first half, total shipments are running ahead of last year's. Atomic energy and other new markets hold promise for future

ONE of the world's oldest metals, lead, is heading for a peak year.

U. S. consumers used 1.2 million tons of it last year. It's possible that consumption this year will reach, possibly surpass that figure.

Opinion — Joseph A. Martino, president, National Lead Co., says: "Present indications are that the consumption of metallic lead and lead products, which has been satisfactory during the first eight months of 1956, will increase during the fourth quarter because of the expected rise in auto production and the usual heavy demand from the battery industry."

While sales to motordom have been off during most of the year, fourth quarter demand for bearing metal and solder should mushroom. Tetraethyl lead for use in gasoline continues to rise (see table). Battery makers, who were hesitant throughout the first half of this year, have entered the market heavily during the third quarter and will continue to purchase substantial tonnages during most of the fourth.

Construction—First half estimates show that U. S. consumers used 14,000 tons of pipe, 14,000 tons of sheet and about 27,000 tons for calking and other construction uses. Lead pipe goes primarily to the chemical industry and for residential plumbing. Lead sheet is used as a corrosion retarding liner for tanks (sulphur, phosphor, chromic acids, etc.).

Bright Spot—Governmental purchases for U. S. supplemental stockpile have helped to establish the market price for lead at 16 cents a pound. Purchases started in July, 1954, and will continue until some 200,000 tons have been bought. While the amounts already received are confidential, estimates of industry reveal that some 64,200 tons were sent to stockpile in 1954; 77,150 tons in 1955; and 32,746 tons during the first half of this year. This means that if the program is kept at the 200,000 level, only 25,904 tons can be purchased for stockpile during the second half of this year. With high level demand anticipated for the fourth quarter, it is felt that only token offers (sellers will have little extra lead to sell) will go to the U. S. until after the first of the year.

New Uses—A compound, about 3 per cent lead, is being used as a stabilizer for colored vinyl plastics and electrical insulation. Some 5000 tons to 7500 tons are being consumed annually for this use. R. L. Ziegfeld, secretary-treasurer, Lead Industries Association, sums up the industry's feeling about two growing areas: "I expect significant expansions for lead in the radiation and ceramic fields." One example of the growing use in ceramics: Experts predict that by 1970 some 30,000 tons of lead will be used in porcelain enamel for coating aluminum. Contrast: This year, only 25,000 tons will be used by the entire ceramic industry.

Atomics — The Naval Reactor

Branch Division of Reactor Development says in a report dealing with reactor shielding design: "Comparisons are usually expressed in terms of lead because it represents the best practical gamma shield material for most applications."

It is being used in combination with steel for vessels which are processing radioactive substances. The outside jacket is steel. The interior is filled with a layer of lead. Wherever weight is a consideration, lead will be used as the shielding material (sometimes in combination with stainless steel). In permanent reactor installations, cement may win out as a more economical material.

Other atomic uses: 1. Lead bricks for portable shielding—they can be designed in curved and saw tooth patterns to prevent any radiation leakage, insure a noncollapsible, portable wall. 2. Returnable and disposable containers to transport radioisotopes and to bury radioactive waste. 3. Leaded glass for reactor portholes, etc.

How Much — Tonnage requirements for atomics are still guesstimates, but lead men are registering added confidence as they see this field opening up. Says Edgar L. Newhouse III, general sales manager, Federated Metals Division, American Smelting & Refining Co.: "With the expansions in the chemical industry and the growth of the U. S. nuclear energy program, the use of fabricated lead products for protection against corrosion and radiation will show marked sales gains."

Strikes High in July

Strike activity rose in July, primarily as a result of the nationwide steel strike.

The Labor department's Bureau of Labor Statistics says 710,000 workers were affected by labor-management disputes in July, well over the 235,000 figure for June.

During the first seven months of this year, there were fewer workers involved in work stoppages than there were during the same period last year. Man-days of idleness increased during the first seven months of this year because of the steel strike and the Westinghouse dispute.

Needed: More Risk Capital

At the present rate of growth, capital investments must be increased by $200 billion every five years. But the sources for risk capital are drying up, study shows

CAPITAL investment in private productive facilities (including plant and equipment, land and natural resources and working capital), totals about $700 billion. Figuring a productive labor force of 55 million, that means each American worker uses assets valued at $12,500, says Council for Technological Advancement, Washington.

Looking at those figures another way: It takes $12,500 to create one job in this country.

And More—For maintenance of present equipment and increased productivity, CTA estimates U. S. business must raise another $40 billion annually at its present rate of growth. A minimum of $25 billion is needed for maintenance ($450 per worker); $5 billion to buy new equipment for new workers; $10 billion for increased rate of productivity.

Metalworking (see table) falls close to the average for all manufacturing. Petroleum ranks highest with an average capital investment per worker of $76,358, while textiles is among the lowest with $5387 (1952 figures).

Automation's child, the instrument field, has had the sharpest rise: From $6100 per worker in 1948 to $10,267 in 1952.

Imposing—Metal products and processes account for about 40 per cent of all capital invested in U. S. manufacturing.

Steel mill investment has been rising rapidly to meet the nation's needs for greater ingot production (see page 134); in metalworking, heat treating and machining equipment, expenditures have been high as new techniques are developed.

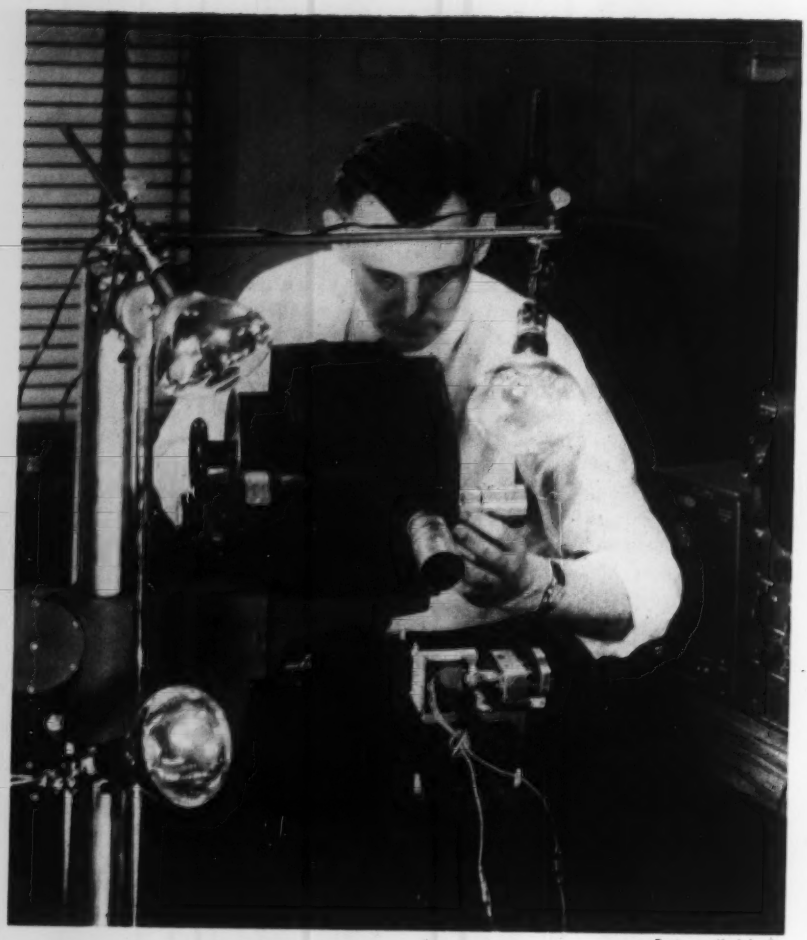
Crux — Although it takes more money to back up the American worker today than 20 years ago, "sources of risk capital have tended to dry up rather than flourish," believes CTA. More money is going into insurance companies, foundations and welfare funds, and less is available as risk capital. The emphasis has swung over to the side of security.

Comments CTA: "Security overemphasized becomes stagnation, as the capital goods industries of England and France have already learned. Then, not only progress, but security itself, is sacrificed." Needed: Education and inducements to promote more "bold ventures on the frontiers of science and technology."

Capital Investment Per Worker

	1952	1939
Metal products & processes	$11,121	$6,627
Iron & steel, nonferrous metals		6,619
Primary metal industries	14,122	
Fabricated metal products, including ordnance	7,718	
Electrical machinery	10,285	4,627
Machinery, except electrical	11,333	7,396
Automobiles	15,064	6,490
Other transportation equipment	8,338	8,331
Instruments & related products	10,267	

Data are not adjusted for price changes.
Source: National Industrial Conference Board Inc.



Eastman Kodak Co.

More Uses for Photography

Any metalworking firm will find that it is useful. Whether you have a $1 million lab or $500 worth of equipment, you must keep up with the latest techniques

YOU'RE MISSING a bet if you aren't keeping an eye on industrial photography. Even if you already have a program, you might reappraise it in light of advances being made by camera and lighting equipment manufacturers.

Every second in this country about 16 flashbulbs pop. Permanently recorded are such diverse events as a Sunday in the park or the damage to an industrial furnace.

Miniaturization—Notes a General Electric Co. spokesman (GE's Lamp Division at Nela Park, Cleveland, snaps 10,000 photographs a year): "For serious photography ten years ago, you needed a truck to carry all the equipment. Today, a good man can get better pictures with equipment that he can easily handle personally."

Smaller cameras and flashbulbs are two of the items helping industry to do a bigger job with photography. Here are some areas you might look into further: 1. Documentation. 2. Research. 3. Employee-community relations. 4. Advertising and publicity. 5. Sales training.

Keeping Records — Documentation is a rapidly growing field for industrial photography. Want to know how much sheet steel you have in stock? Take a photo of it (so that the edges of the sheets show up), and run the film through a special viewer which will count each sheet.

The easiest way to record test setups in the laboratory is with a photo, believes a research manager. Aircraft and automotive firms like uses of this sort.

The Trends — Large firms are tending to centralize their photo activities under one man and in one section. Ford Motor Co.'s new research center in Dearborn, Mich., allots 18,000 sq ft for its photo lab and has almost $1 million worth of equipment.

Polaroid cameras have proved a handy tool for Ford foremen: They can snap damage pictures themselves; rapid development lets them know immediately if they got the right scene. If not, they can try again.

High speed motion picture photography is another comer in industry: "The whole field has been revolutionized in the last year. We're getting pictures we could never get before," says an Eastman Kodak Co. executive.

Picture Takers—A good photographer is more than a picture taker. He understands the unique use for which the photo is intended and can follow through on the developing and printing.

Keep that distinction clear if you aren't making use of industrial photography, but plan to in the future. Your engineers or researchers might be able to take better shots than a professional because they know what they're trying to record.

But get the advice of professionals before you embark on any new program. A retainer to a good local man can pay off in many ways. Be sure to contact manufacturers' representatives for information on the latest developments and techniques.

One way to get started: Find an employee who is interested in photo-

graphy and give him some time to check on possible uses in your plant. Says one camera manufacturer: "$500 worth of equipment can get a small metalworking firm started. The department can expand as new uses are recognized."

Some of the advantages in having your own man or department: 1. He is always available. 2. He won't have to be cleared for governmental projects. 3. There's no danger of a competitor using him.

Salesmen Earn More

A new survey by the American Management Association examines the salesman's lot

MANUFACTURERS' salesmen increased their earnings by 3.5 per cent last year, reports American Management Association.

About 75 per cent of the 14,093 salesmen covered by an AMA survey earned between $5000 and $15,000. Experience range: From a new salesman for a food company to an old timer with a diesel locomotive manufacturer.

Incentives — Bonuses and commissions formed a significant part of a salesman's earnings in 77 per cent of the companies studied. Base salaries are lower when bonuses and commissions are paid, but on the average the group earned more than salesmen working on salary alone.

Depending on the industry, incentives range from 10 per cent to 100 per cent of total compensation. Bonuses are commonly based on quotas that set dollar volume of sales as the salesman's target.

Survey—Nearly 200 companies participated in the survey which was conducted from the spring of 1955 to the spring of 1956. Positions included: Sales trainees, three grades of salesmen, sales supervisors and district and regional sales managers.

The report analyzes salaries, bonuses, benefits and expense accounts. It is available to AMA subscribers. Write: Executive Compensation Service, AMA, 1515 Broadway, Times Square, New York 36, N. Y.

Faster Production Control

IBM's new automatic production recording system (APR) gives management a new tool for decision making on the production line. Instantaneous action is now possible

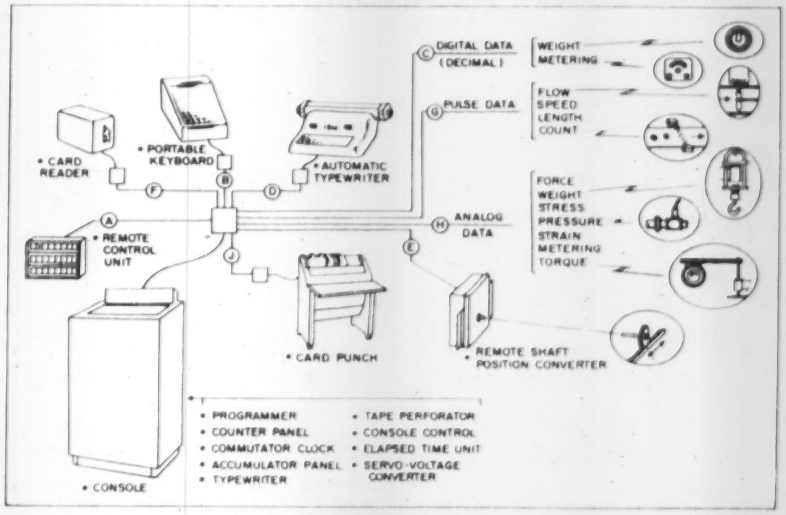
INTERNATIONAL Business Machines Corp. says that on the spot supervision of production is possible with its new automatic production recording system (APR).

Manually collected production line data are expensive to obtain and often unreliable. APR will tabulate such variables as weight, count, length and temperature on the production floor and transmit the information to data processing machines capable of preparing production, cost, inventory and other management reports.

Two Tongues—The new system expresses itself in machine (digital) and human language. It collects, correlates and stores production data in punched tape and cards. Automatic typewriters along the production line print reports for supervisors.

Depending on the complexity of the system, rentals will range from $235 to $1200. Building block units include automatic and manual input units, prepunched card readers, printing card punches, remote typewriters and a control console.

Case in Point—A plant producing electric motors on an assembly line basis might want this information: 1. Motors produced. 2. Number passing inspection. 3. Productive and nonproductive hours. 4. Date. 5. Reason for rejects. 6. Hourly production report, rejection and repair rates. APR will provide this information, says IBM, as needed or at predetermined reporting times.



Here's a diagram of some of the possible combinations of the new IBM system. Sensing devices (at the right) pick up information from the production line. This information is transmitted to the control console in one of three forms: Digital (expressed in terms of numbers) which answers question of how much or how many; analog (expressed in terms of some other physical variable); and pulse, one of several methods which can be used to transmit both digital or analog values. Next step: Control console instructs the production line through an output device like the remote shaft position controller. It also can be linked to other units, like automatic typewriters, card punches and readers, portable keyboards and other remote control units. These will provide information on hourly production rate, quality, etc. They also can be used to feed new instructions back into the system

BDSA Gets More Calls For Aid on Priorities

CALLS for help to get priorities jumped 65 per cent in the past year because of material shortages, says the Business & Defense Services Administration. Part of the increase can be attributed to the steel strike, but, privately, BDSA people attribute a good share to the simple fact that many firms have forgotten how to use their defense rating properly. Personnel who handled priorities during World War II and the Korean War have moved up the ladder, and their successors haven't been paying too much attention to the procedures until they get into a pinch. Only a little of the trouble can be traced to suppliers who do not honor defense rated orders. In the few such cases that have turned up, compliance generally was prompt after the negligence was pointed out; BDSA, as far as is known, has no cases requiring legal action on its books. Questions on priorities (for direct defense contracts only) can usually be handled at Commerce field offices.

Make Way for Missiles

Reuben Robertson, deputy secretary of defense, says: "Limitations of funds will not delay this vital program." (Missile procurement in fiscal 1957 will be over $2.5 billion.) In addition, a good share of the $5.2 billion the Defense department is spending this year for new weapon development and testing—compared with $3.4 billion in fiscal 1956—will go into missiles.

Target: Lead Time

Mr. Robertson also heads up a group studying ways to reduce lead time on new manned aircraft. Recommendations to date amount to: "Cut red tape." Specifically, the Defense department is told to: 1. Have a better idea of what it wants before starting a project. 2. Simplify procedures covering DOD-contracting relations. 3. Spread around more technical and requirement information to contractors. 4. Act faster on contractor requests for government furnished industrial facilities.

U.S. Studies Gas Turbine

Keep your eye on the gas turbine; government interest in it continues to run high. The Maritime Commission started tests last week on a converted Liberty ship with one of these power plants. Another converted Liberty with a free piston gas turbine is due for service in December. The Army has four firms doing design studies on a small (250 hp) gas turbine for aircraft. It could be used in a variety of aircraft, including helicopters. The attraction: More horsepower per pound than current engines deliver.

Memo on Nickel Scrap

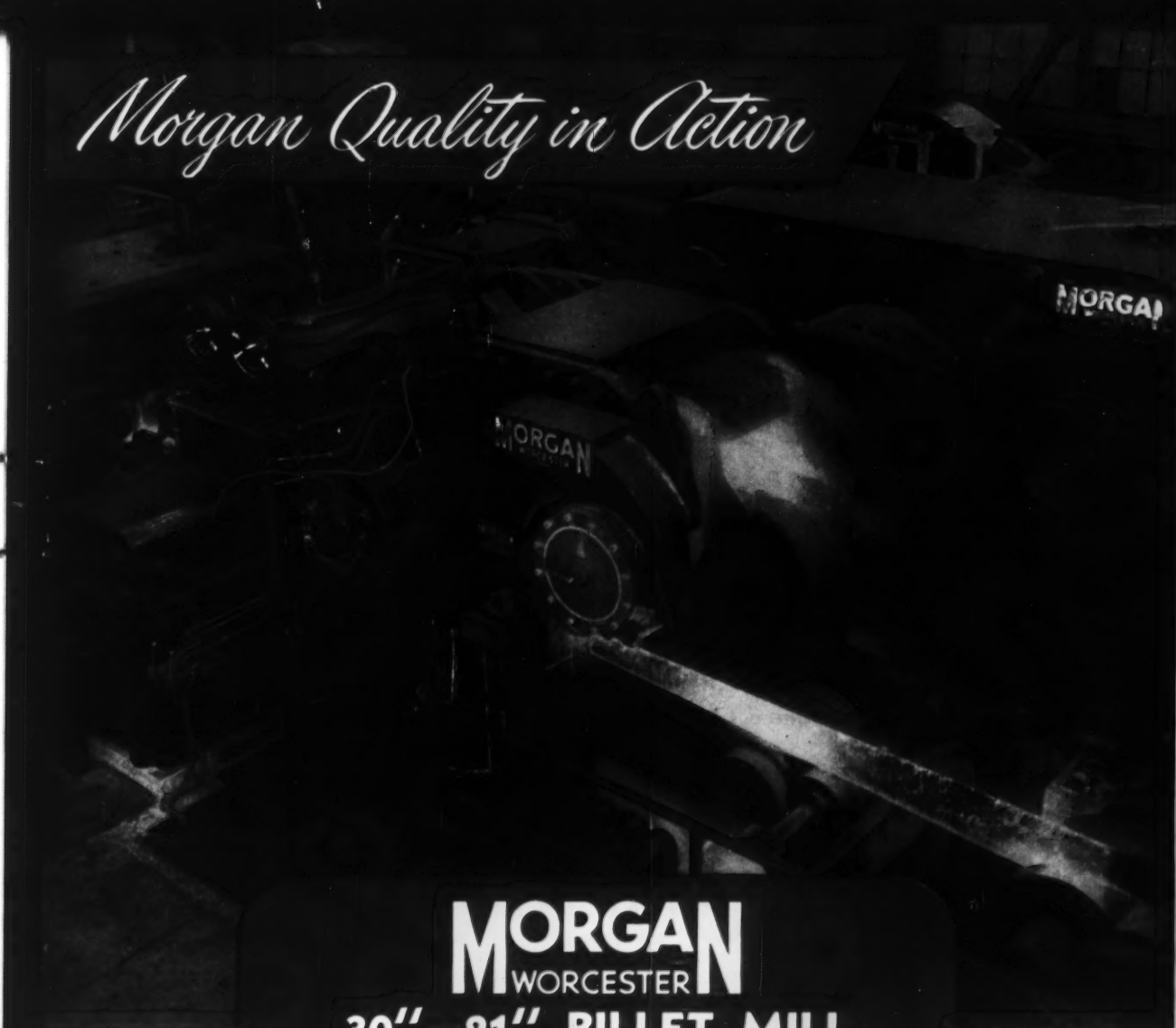
Some regulations on nickel scrap exports have been relaxed. Nickel-copper scrap can be sent abroad if at least 90 per cent of the recovered nickel is returned to the U. S. The scrap involved, claims the Bureau of Foreign Commerce, is not being processed on a commercial scale in this country.

Washington Whispers

Congressmen are marshaling forces to turn back any attempt at manpower cutbacks by the Defense department . . . Proponents of right-to-work laws expect that provision of the Taft-Hartley Act to be the prime union target in the next Congress . . . BDSA has enrolled 54 more industrial men in its executive reserve: They'd go to work for the government in case of emergency . . . In addition to the recent extension of a contract covering the development of nuclear propulsion for ships, Westinghouse Electric Corp. has an $18-million order for reactor compartment components for a nuclear-powered light cruiser which will be used to launch guided missiles. It will be the Navy's first nuclear-powered surface ship.

Meet Moxie S. George: He's on loan from Inland Steel Co. to head up the semifinished, rail, structural, bar, wire and forging branch of BDSA's Iron and Steel Division. At Inland he's manager of sales, railroad division.

Morgan Quality in Action



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Stacy Black: Management Developer

THOMPSON Products Inc.'s Stacy Black is a concise man with a wordy title—staff director for executive development and assistant to the vice president for human relations.

"The top officials here," relates Mr. Black, "think one of the most difficult problems facing industry is the shortage of good management men. My job is to help Thompson solve that problem."

Methods—Because Thompson (headquartered in Cleveland) has 21,000 employees and 16 plant locations and makes such diverse products as automotive, aircraft, electronic and other industrial components, it is decentralized and operates on a line-and-staff basis. Mr. Black's is a staff position. He co-ordinates the company's various management development programs, supplies information to and advises the various departments, divisions and subsidiaries on development problems. "I act as a catalytic agent," he says.

Stacy Black spends most of his time coordinating Thompson's college recruiting drive, administering scholarships for engineering and accounting students, helping to conduct a conference group in management practices, keeping track of the company's continuing executive inventory and shepherding a "business intern" program.

Business Interns—This plan is for people who have special interests in and potential for management. The number in the program varies according to needs and availability. Many candidates turn up in the regular college recruiting. Others come out of the armed forces. The men get a training according to their backgrounds. "When a division manager tells me he needs an assistant department manager," says Mr. Black, "I can often submit a couple of good candidates from among my interns."

In Thompson's executive inventory, management men are appraised periodically by their superior and at least two others. A man's strengths and weaknesses are judged and a campaign for his development is mapped. One of Stacy Black's tasks is to encourage the development program to be carried out. He spends time, too, on details of an annual ten-session conference in management practices. About 35 promising middle management men from the company's plants around the country come to hear top officials' philosophy, new things in executive practices and plans for Thompson.

Background—Mr. Black came to Thompson in 1939 from Fenn College in Cleveland where he had been finance director and, earlier, dean of business administration.

As one of his outside activities he teaches golf. "It's almost as interesting as teaching business," he says.

Tool Technician Bernie Goering (left) helps boring mill operator Frank Stahorsky out of a jam. In this job, a cut was completed without a pilot. Warner & Swasey's total down time for the trouble was about 45 minutes

Teamwork on Tooling

WARNER & Swasey Co. undoubtedly gets its fair share of tooling problems, but a crew of touring specialists sees to it that each one is short lived.

Helping foremen keep production on the move is a primary objective of W&S "tool technicians." They operate as an emergency squadron, solving tool troubles before they snarl up the flow of work through the shop.

Rush—Take the call John Peters, technician foreman, got last week. A pilot had snapped off a boring bar in department 38, horizontal boring mills. Mr. Peters located Bernie Goering, one of his technicians, and told him to report to the foreman of the department as soon as possible.

Working with the machine operator, the tool technician first found out what had caused the pilot to break—an uncompleted earlier cut. Since it would take a couple of hours to replace the tool, he figured out how the job could be run without the pilot. Total down time on the machine was less than an hour. The machine foreman spent less than 5 minutes on the problem.

Specialists—The department has nine hand-picked men who work under Mr. Peters. They go on salary when they're brought in. A. Haeme, tool superintendent for the Cleveland machine tool builder, oversees the group.

How does the company pick a man for the job? Mr. Haeme says a successful candidate must have three qualities:

First, he must be a good mechanic. Most of the men were top machine operators before they were tapped.

Second, the man must show qualities of responsibility, leadership and judgment that mark him for further growth in the company. W&S considers this department a prime proving ground for future foremen and superintendents.

Third, the man must be able to get along with both shop and office personnel. He works closely with operators every time he solves a problem. He also may work with standards, methods or purchasing departments to get permanent solutions to immediate problems.

Training—Any man picked for the job is an authority on tooling, at least for the type machine he ran before. His first assignments are handled with other technicians, who acquaint him with tool problems on other machines.

"A big plus here," explains Mr Peters, "is the fresh approach the new man can bring to problems he has never had to face." Gradually, he becomes experienced in almost all phases of tooling.

Projects — Emergency calls are the first responsibility of the department. They're handled on a first in, first out basis.

Warner & Swasey also puts the know-how of the department to work on special tooling projects—a week ago, it had a backlog of 61 of these jobs. These specialists test cutting fluids, tool up new machines, check with the standards department on job ratings and work with methods engineers on job procedure. A recent study of new carbides led to a recommendation that lathe speeds should be upped by 20 to 40 per cent.

In Business—The department is making a substantial contribution. About 40 calls a day are handled. Information uncovered in special project work is a bonus.

Model T from Germany

By contrast with American and other auto makers, the Germans are having a good year. Volkswagen is their top car, with sales limited only by production capacity

"SORRY, but we can't give you delivery in less than three months. Some of the other dealers are quoting four and five."

Statements like this from American dealers indicate that the Volkswagen, Germany's midcentury Model T, may be in the happy spot of being one of the few cars in the world whose sales are limited only by production capacity.

Background—Last year, Volkswagen exported 54 per cent of its total output of 330,000 cars. U. S. sales were close to 39,000 units. This year, the U. S.'s allocation is about 60,000. It's already close to being completely sold out.

Volkswagen is steadily increasing its output. So far this year, it's probably running ahead of any of our popular makes, including Plymouth, Dodge, Pontiac, Oldsmobile or Mercury.

Investment — To boost output, Volkswagen has plowed back more than $1 billion into new plant since 1948. It now takes only 23 workers to put one Volkswagen together, compared with 50 in 1950—a productivity gain of 140 per cent. Over the same period, sales per employee have risen from $6400 to $10,500 a year, up 65 per cent. Wages per employee have increased an average of 52 per cent.

Benefits of the $41 million spent in 1955 are just being realized. A new factory is making commercial vehicles in Hanover, freeing the main Wolfsburg plant to concentrate on automobiles. Production at Hanover is up to 220 units a day. It's soon to be raised to 300. The Wolfsburg facilities are turning out a capacity 1520 cars daily. A large part of the $75 million investment planned for this year and 1957 will go to increase their output.

Tit for Tat—The U. S. is Volkswagen's star export customer. The Germans are betting on the growing second-car market to keep things that way. In return, they are placing a good part of their equipment spending dollar back here in the U. S. Example: Alco Products Inc., New York, is supplying 36 body metal presses which will boost output at the Wolfsburg plant.

World Trade Notes

• August Thyssen - Huette A.G., Germany, has signed up with the Export-Import Bank for a $10-million loan to buy equipment in the U. S. Company officials say they are negotiating contracts with six to eight American steel mill equipment builders. Deliveries are to be made within the next 18 months.

• Britain's industrial switch from coal and other fuels to oil is still gathering pace. Orders for oil equipment and materials in the first half of this year are up 17 per cent from the like period in 1955, to a $207 million total.

• Foreign-owned assets in the U. S. reached a record of $29.6 billion at the end of 1955. This total is close to the record $29 billion in private U. S. investment overseas (STEEL, Sept. 3, p. 48). However, the $29.6 billion in foreign holdings is made up not merely of private investments but also of official government reserves and other funds. While Americans have $19 billion invested directly in foreign manufacturing subsidiaries, foreign-controlled enterprises in the U. S. are capitalized at just $4.3 billion.

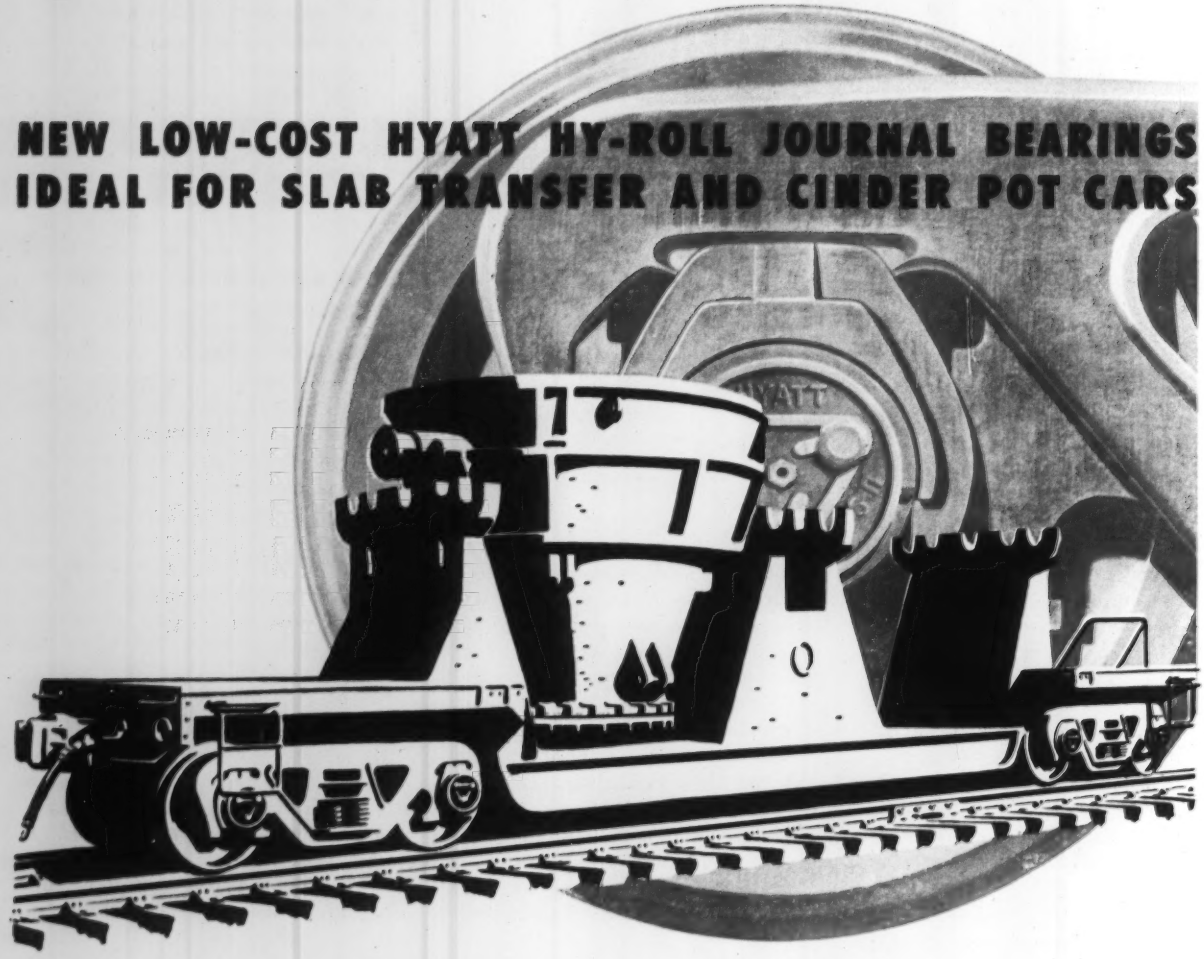
• Swedish farmers are in the thick of a mechanization program. Since 1929, they've spent a total of $228 million on tractors. No less than 65 per cent of this has been put out in the last five years. To counteract a sharply felt manpower lack, their over-all spending for farm mechanization is running about $60 million a year.

• Garret Corp., Los Angeles maker of aircraft accessories and components, notes increasing foreign interest in American-built equipment. The company's components are going into planes built in France, Italy, Holland, England and Spain, among other countries.

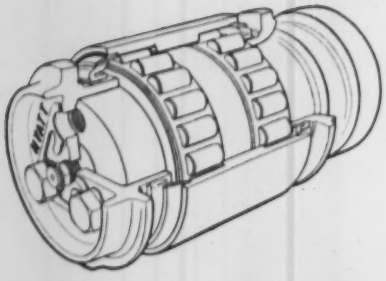
Know-How: Two-Way Street

Rust Furnace Co. and Loftus Engineering Corp., Pittsburgh, will start using German-designed, American-built heat exchangers in steel mill equipment this fall. Here Dr. Alfred Schack, the German designer, is seen inspecting machinery at Griscom-Russell Co., Massillon, O., which will produce the heat exchangers

NEW LOW-COST HYATT HY-ROLL JOURNAL BEARINGS IDEAL FOR SLAB TRANSFER AND CINDER POT CARS



Simplified, Extra-Rugged Design with Straight Cylindrical Rollers Withstands Rough Handling

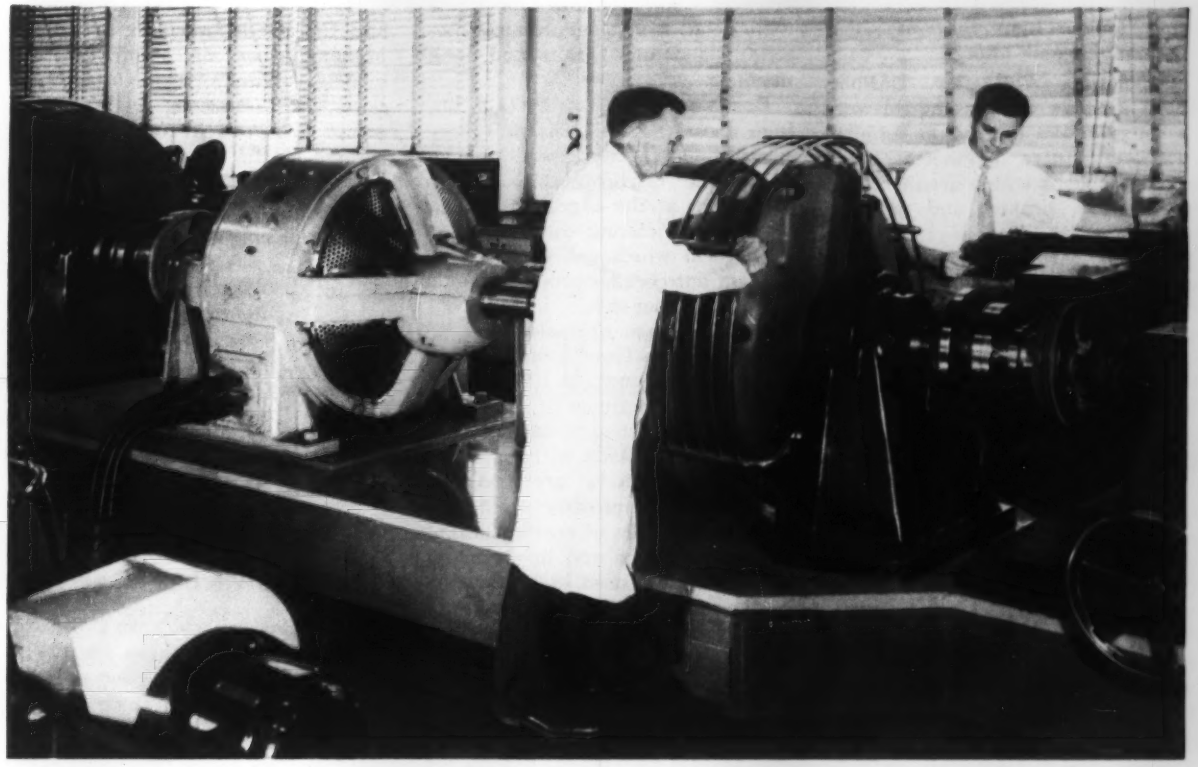


This new HYATT Hy-Roll Journal Bearing, recently introduced to cut the cost of roller bearing application and maintenance on railroad freight cars, is well suited for heavy-duty service on steel mill rolling stock such as slab transfer and cinder pot cars.

This bearing, available in sizes 5½ x 10, 6 x 11 and 6½ x 12, will fit all cars with standard AAR integral or pedestal type side frames. There are only four parts on the axle. The husky, high-capacity, straight cylindrical rollers are positively sealed in a 3-year supply of lubricant; dirt and water are sealed out. These features assure better ability to stand up under the heavy loads, shock and severe punishment of steel mill service. For improved performance and long-run economy, talk to your Hyatt Sales Engineer about Hy-Rolls today! Hyatt Bearings Division of General Motors, Harrison, N.J.

GM GENERAL MOTORS

HYATT *HY-ROLL BEARINGS* FOR STEEL MILL CARS



This giant dynamometer tests brake linings and drums at Chrysler Corp.

Cermets for Auto Brakes?

Several technical problems must be solved before the material would be commercially feasible. But cermets point to the direction in which brakes may be improved

AUTO MAKERS have been using long wearing ceramic materials in bearings for several years. Now they're investigating ceramic-metal compounds as a likely substitute for organic brake linings.

Industry calls these compounds cermets. One reason they have been so successful in bearings is that the glazed surface contributes to longer wear and improves heat resistance.

Glazed organic linings have these drawbacks: Friction losses and poor stopping qualities. The problem is to get a mix which retains maximum friction while providing for the greatest amount of wear and high resistance to heat.

Tryout—Bendix Products Division, Bendix Aviation Corp., South Bend, Ind., has developed a cermet which it calls Cerametalix. It's already proved successful in aircraft brake friction discs and in dry friction clutch facings for heavy tractors.

Bendix's work with cermets is summed up by William H. DuBois in a paper presented last week at the Society of Automotive Engineers' national tractor meeting in Milwaukee. Mr. DuBois is chief engineer of the product division's ceramic lining and engineering department.

Report — He explains that the ceramic particles provide friction and partially insulate the metal matrix which holds the particles together.

"The real secret in producing a cerametallic friction material is that of forming a proper spinel (mineral coating) on the surface. Ingredients and techniques used to form this hard spinel surface and to maintain it in a thin layer are largely the governing factors in producing a usable material," asserts Mr. DuBois.

Wear — Tests by Bendix show that slightly less than 20 per cent of lining wear in brakes is caused by work done. "About 40 per cent of the wear results from high flash surface temperatures and the other 40 per cent from soaking temperatures on the brakes after a stop has been made," says Mr. DuBois.

In developing cermets which will withstand high temperatures, he stresses that the materials must not fuse with the opposing surface and must not deteriorate under

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operating temperatures of 2000° F. He adds that the wear life of Cerametalix linings is three to ten times longer than that of conventional organic linings.

Opposition—While Mr. DuBois hopes cermets will be the answer to better brake linings, he admits that automotive engineers have posed problems which aren't found in aircraft brakes and tractor clutches.

All the carbuilders are experimenting with ceramic lining materials as well as metal, silicate and sintered ore products. Chrysler Corp. engineers highlight some of the headaches still to be solved before organic linings are scrapped.

Clutched — Dr. D. Maxwell Teague, head of Chrysler's chemical research department, points out that the trend to automatic transmissions pretty much does away with any need for friction clutch facings in automobiles.

From the brake angle, cermet linings are noisy and lead to brake fade under repeated stopping conditions. These factors aren't particularly significant to aircraft requirements, but they are decidedly important in the automotive field.

Fade—Philip J. Willson, supervisor of Chrysler's chemical research friction lab, reports: "A plane only has to make one stop, and then its brakes get a chance to cool off. This isn't possible with cars. Then, too, if cermet discs on airplane brakes wear after 100 or 3000 stops, they can be replaced. A taxicab might make that many stops in a day."

Mr. Willson adds that neither noise nor dirt is a factor on plane brakes. Automobile brakes, however, have to operate even on dusty, dirty roads, and the harsh chatter set up by cermet linings would aggravate drivers.

Drums—Stuart T. Ross, supervision of metallurgical research for Chrysler's engineering division, reports that cermet linings have a habit of scoring or galling brake drums. This probably is more prevalent with aluminum drums because they dissipate heat more quickly than other types.

Mr. DuBois indicates Bendix has found that high strength cast iron and hardened steel are the best drum materials. He admits there may be better materials which haven't been discovered. It may turn out that cermet linings won't work with aluminum drums, which will mean more compromises between heat dissipation and long drum life.

Cost—Most cermet friction linings are discs and constrained by a metal cage. This retaining shell keeps the brittle particles from crumbling at the edges. Mr. Ross warns that making cermet linings in a form which can be used for present auto brakes probably would be pretty expensive.

Despite these obstacles, the industry is far from giving up on cermets. Sumner B. Twiss, assistant chief engineer of Chrysler's research departments, says: "Friction brakes will be with us for a long time. There are two approaches to improving them: 1. Develop methods of cooling brakes so present drum and lining materials can be used. 2. Develop better materials. Cermets are a good start in that direction."

NADA Fights Price Hikes

The National Automobile Dealers Association has lashed out at the auto industry again. Carl E. Fribley, president, says the higher manufacturing costs of 1957 cars should be absorbed by the companies.

He adds that dealers are unable and the public unwilling to stand higher prices on improved '57 models. *Ward's Automotive Reports*, for example, claims low priced '57s will average $100 increases at the factory retail level.

How will this affect 1957 sales? Mr. Fribley charges: "In my opinion pricing of the 1957 models could mean the difference between a 6.5-million to 7-million car year or a 5.5-million to 6-million year for the automobile industry."

Spokesmen for the industry feel consumers have high enough incomes so they won't squabble over a higher sales ticket. One thing is sure — if sales do slump next year, auto makers will be quick to cut prices.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804	659,763
August	401,997†	614,493
8 Mo. Total	4,043,288†	5,531,410
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Aug. 11	108,155	149,199
Aug. 18	98,348	138,209
Aug. 25	69,977	129,591
Sept. 1	58,233	85,851
Sept. 8	48,063†	79,366
Sept. 15	54,000*	122,263

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.

Chevvy Switches

Chevrolet, which hasn't scheduled any major changes for 1957, apparently has pulled a last minute switch to keep it in the running.

Rumors from the GM Division have it that Chevrolet will put a semi-fuel injection system on its 283-hp Corvette engine. This same engine is available on standard Chevrolet cars.

The fuel injection system has been developed by GM's Rochester Products Division. It already is scheduled to appear on Cadillac's Eldorado Brougham.

Whether or not Chevvy will push the FI equipped engine is a moot point. After recent congressional hearings (see STEEL, Sept. 10, p. 113), the general feeling of the industry has been to de-emphasize horsepower. While fuel injection doesn't necessarily increase horsepower, it may focus attention on performance and economy which auto makers plan to push ahead.

Exhaust Notes

- After holding out for 43 years, Ford Motor Co. finally has become a member of the Automobile Manufacturers Association.
- Allison division of General Motors, Indianapolis, has been awarded a $13 million Air Force contract for developing technical data on J-71 turbo-jet engines.

FACTS

about

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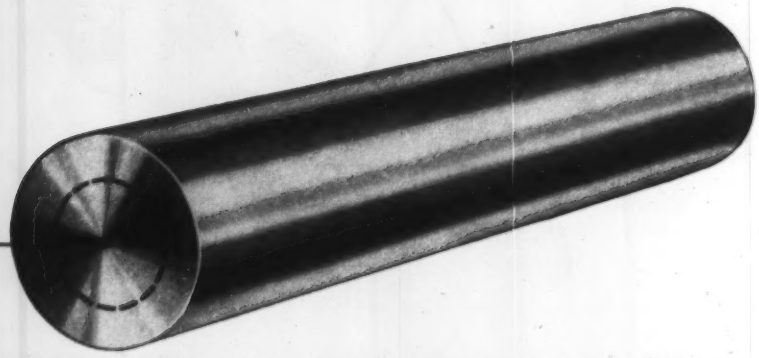

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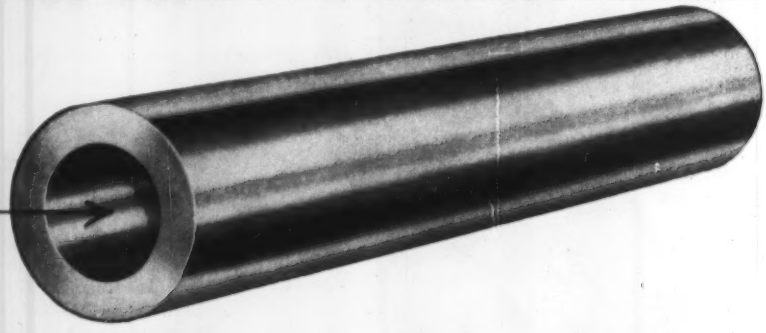

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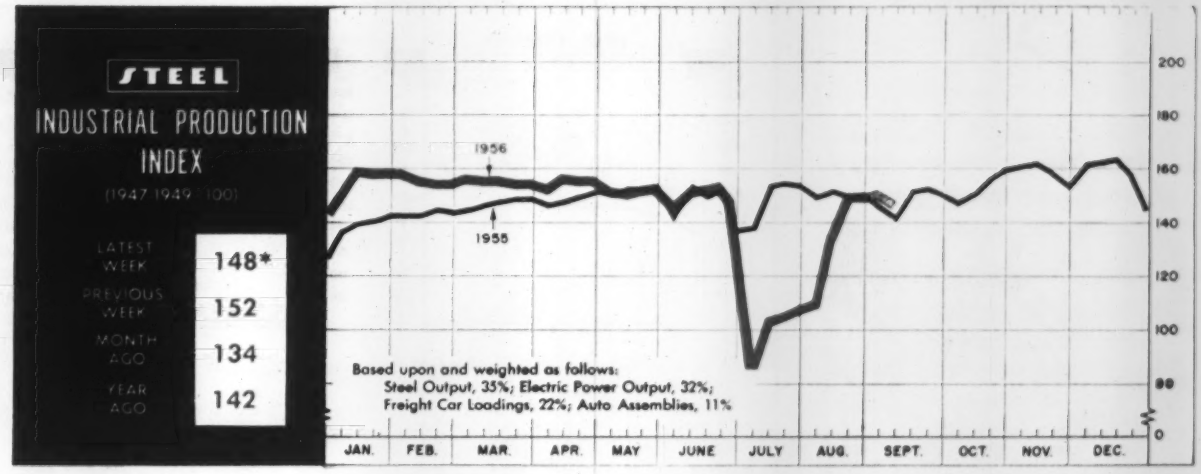

*Week ended Sept. 8.

Federal Spending Bolsters Strong Economy

GOVERNMENTAL spending, long an important prop under the entire economy, is on the uptrend. And if any serious cracks appear in the civilian portion of the economy, you can expect Uncle Sam to mend them with even more cash outlays.

Out of the estimated gross national product of $410 billion for 1956, about $80 billion, or 20 per cent, will be accounted for by all levels of government — federal, state and local. Federal spending is by far the most important because of its size and direct impact on business. It is now set at $69.1 billion for fiscal 1957, up $2.7 billion from fiscal 1956.

Outlook — The rate of federal spending will hold for another year or two, especially if world conditions remain as they are today. Over the longer term, indications are that the rate will do no worse than stay even—might even increase. Unobligated funds (money not actually spent, but which the government in effect says it will cover at a future date) are the key here. In fiscal 1957, governmental agencies have $69.7 billion in obligation authority, compared with only $62.1 billion last year. This has its short-term implications, too (mostly psychological). Businessmen are assured that government is not heading for any immediate slump, and they can make their plans accordingly.

Another indication of continued high spending by the government comes from departmental planners, who say it is not economically feasible to expand or contract actual expenditures in a hurry. It costs too much in time, paper work and lost investment, such as progress payments. That's especially true of long lead time metalworking items like aircraft, missiles and ships, which account for about three-fourths of all Defense department procurement dollars. In addition, Defense and other governmental officials are keeping an eye on the general economy of the nation. They know only too well

BAROMETERS OF BUSINESS

	Latest Period*	Prior Week	Year Ago
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,463[1]	2,429	2,309
Electric Power Distributed (million kw-hr)	11,400[1]	11,565	10,155
Bituminous Coal Output (1000 tons)	10,145[1]	9,950	9,449
Petroleum Production (daily avg—1000 bbl)	6,500[1]	6,999	6,662
Construction Volume (*ENR*—millions)	$243.9	$616.4	$375.7
Auto, Truck Output, U. S., Canada (*Ward's*)	66,573[1]	77,438	98,546
TRADE			
Freight Car Loadings (1000 cars)	720[1]	784	707
Business Failures (Dun & Bradstreet)	237	215	215
Currency in Circulation (millions)[3]	$30,787	$30,618	$30,436
Dept. Store Sales (changes from year ago)[3]	+2%	+8%	+11%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$17,069	$20,213	$16,049
Federal Gross Debt (billions)	$275.6	$275.4	$277.9
Bond Volume, NYSE (millions)	$15.6	$15.0	$21.1
Stocks Sales, NYSE (thousands of shares)	7,145	8,032	9,703
Loans and Investments (billions)[4]	$85.6	$85.6	$84.4
U. S. Govt. Obligations Held (billions)[4]	$26.6	$26.9	$30.9
PRICES			
STEEL's Finished Steel Price Index[5]	225.71	225.71	207.63
STEEL's Nonferrous Metal Price Index[6]	262.7	262.5	262.3
All Commodities[7]	114.7	114.6	111.1
Commodities Other Than Farm & Foods[7]	122.2	122.3	117.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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Stopper Rod Tile

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High Temperature Air-Setting Cement Assures High Moisture Retention . . . Guarantees Stronger, Tougher, Tighter Bond For Stopper Rods

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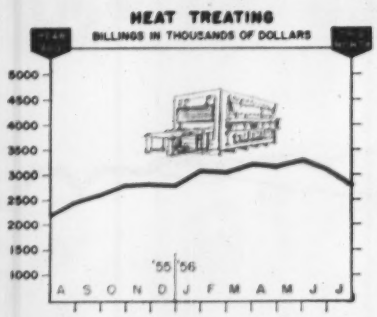
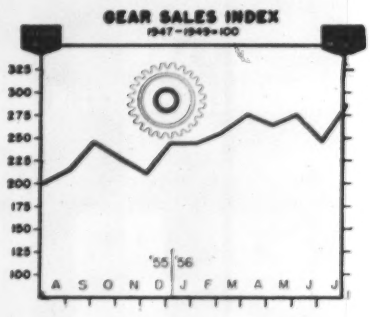
THE BUSINESS TREND





	1956	1955	Per Cent Gain Or Loss
January	3,082.8	2,181.0	+41.4
February	3,045.2	2,184.5	+39.4
March	3,226.2	2,599.5	+24.1
April	3,172.0	2,579.5	+23.0
May	3,292.3	2,644.4	+24.5
June	3,094.5	2,645.1	+17.0
July	2,762.5	2,180.0	+26.7
August		2,439.3	
September		2,581.0	
October		2,785.1	
November		2,809.1	
December		2,786.6	
Total		29,601.2	

Metal Treating Institute.
Charts copyrighted, 1956, STEEL.

	1956	1955	1954
Jan.	245.5	140.9	187.4
Feb.	256.2	148.5	185.1
Mar.	276.5	172.8	128.6
Apr.	264.7	179.8	158.2
May	275.6	205.2	132.5
June	245.4	193.5	127.4
July	286.7	201.7	141.3
Aug.		217.6	154.7
Sept.		246.5	135.1
Oct.		227.6	152.3
Nov.		210.4	116.7
Dec.		245.5	182.2

American Gear Mfrs. Assn.
Industrial Heating Equipment Assn. Inc.

what problems would arise in such industries as aircraft if they were to order heavy cutbacks.

Look for Clues—This year, Defense will shovel $36 billion into business channels, a slight increase over fiscal 1956. About one-third of this finds its way into industry's pocket (mostly metalworking's). Because actual expenditures are not likely to be shifted significantly one way or the other over the short term, the most important thing to watch is new orders placed. They are currently on a high level. Any major change in policy in this regard would take about 18 months or longer to show up in cash outlays.

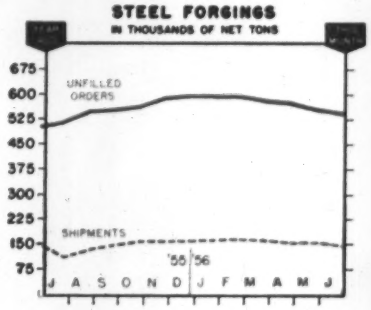
Some change in what this money goes for is likely. This year, the Atomic Energy Commission will spend about $2 billion, $300 million more than last year. Missiles are due for a fast increase. Aircraft and ships will drop off a little, while other conventional weapons and ammunition will slip downward rather swiftly.

Big Backlog—Military construction could increase with emphasis on base dispersal, which has begun to show up. Nike sites and air bases are also on the docket. When those run out, there is still a backlog—some of these projects may run to $5 billion each, and could be brought in if needed.

Big Plus—None of this includes the government's huge roadbuilding project, which will have an impact on metalworking all its own (see page 227). There will be about $1.15 billion for fiscal 1957 in the highway trust fund alone.

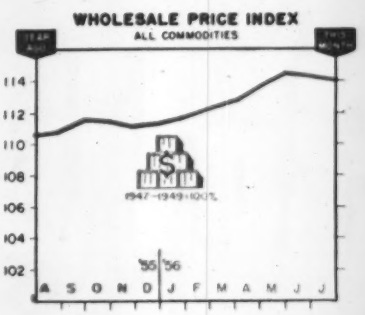
Employment Peaks

Employment reached its peak in August at 66,752,000—97,000 above the July total. Nonagricultural industries showed the rise expected after the steel strike was settled, but the 532,000 increase was almost nullified by the 435,000 decrease in agricultural workers, according to the Labor and Commerce departments. While many manufacturers expect to increase their labor forces in September and October, the total will drop because of the back-to-school movement. In its monthly labor survey, the Cleveland Chamber of Commerce notes that a moderate increase in employment is looked for this month. Because of the wide diversity of industry in this area, the survey usually indicates the national trend.



	Shipments		Unfilled Orders	
	1956	1955	1956	1955
Jan.	160	136	589	453
Feb.	152	135	589	460
Mar.	159	154	578	479
Apr.	150	150	569	475
May	151	147	551	488
June	143	155	540	501
July	...	115	...	513
Aug.	...	135	...	547
Sept.	...	149	...	552
Oct.	...	158	...	560
Nov.	...	158	...	585
Dec.	...	158	...	592

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.



	1956	1955	1954
Jan.	111.9	110.1	110.9
Feb.	112.4	110.4	110.5
Mar.	112.8	110.0	110.5
Apr.	113.6	110.5	111.0
May	114.4	109.9	110.9
June	114.2	110.3	110.0
July	114.0	110.5	110.4
Aug.	....	110.9	110.5
Sept.	....	111.7	110.0
Oct.	....	111.6	109.7
Nov.	....	111.2	110.0
Dec.	....	111.4	109.5

U. S. Bureau of Labor Statistics.
*Preliminary.

The weekly pay check of the average American worker also scored new gains during August, reaching a record high of $79.79 for an average of $1.98 an hour.

Construction Keeps Pace

August went into the books as another record month in the construction industry. The Labor and Commerce departments say construction put in place rose to $4.3 billion for an annual rate of $44.3 billion. An indication that construction is declining somewhat comes from *Engineering News-Record*, which reports that contract awards for future construction declined 20 per cent from the July mark, although they were the second best for the month since August, 1952.

The rising cost of building will have to be considered even more when evaluating dollar figures over the next few months. *ENR* says construction costs are now 4.8 per cent above those a year ago; building costs are up 4.4 per cent.

Index Reflects Holiday

STEEL's industrial production index gave one more indication of the rush-rush pace of industry in the Labor Day week ended Sept. 8. It declined only 4 percentage points, from 152 to an estimated 148 per cent of the 1947-49 base period. Largely responsible was an increase in steel operations and heavy use of electricity. The American Iron & Steel Institute estimates that for the week ended Sept. 16, the nation's steel mills were operating at 100.1 per cent of theoretical capacity, only the sixth time this year the capacity figure has been exceeded.

Market Memos

- Through July, the nation's heat treaters were booking orders at a clip 28.4 per cent ahead of the rate of the first seven months of 1955. (See chart on page 110.)
- Although the new order index of the Foundry Equipment Manufacturers Association fell to its lowest point in ten months (110.3 per cent of the 1947-49 average), officials in the industry are not worried about business. They explain that backlogs are heavy and current business active. One or two unusually large orders in a month like May (207 per cent of the base) can give the wrong impression of another period, they claim.

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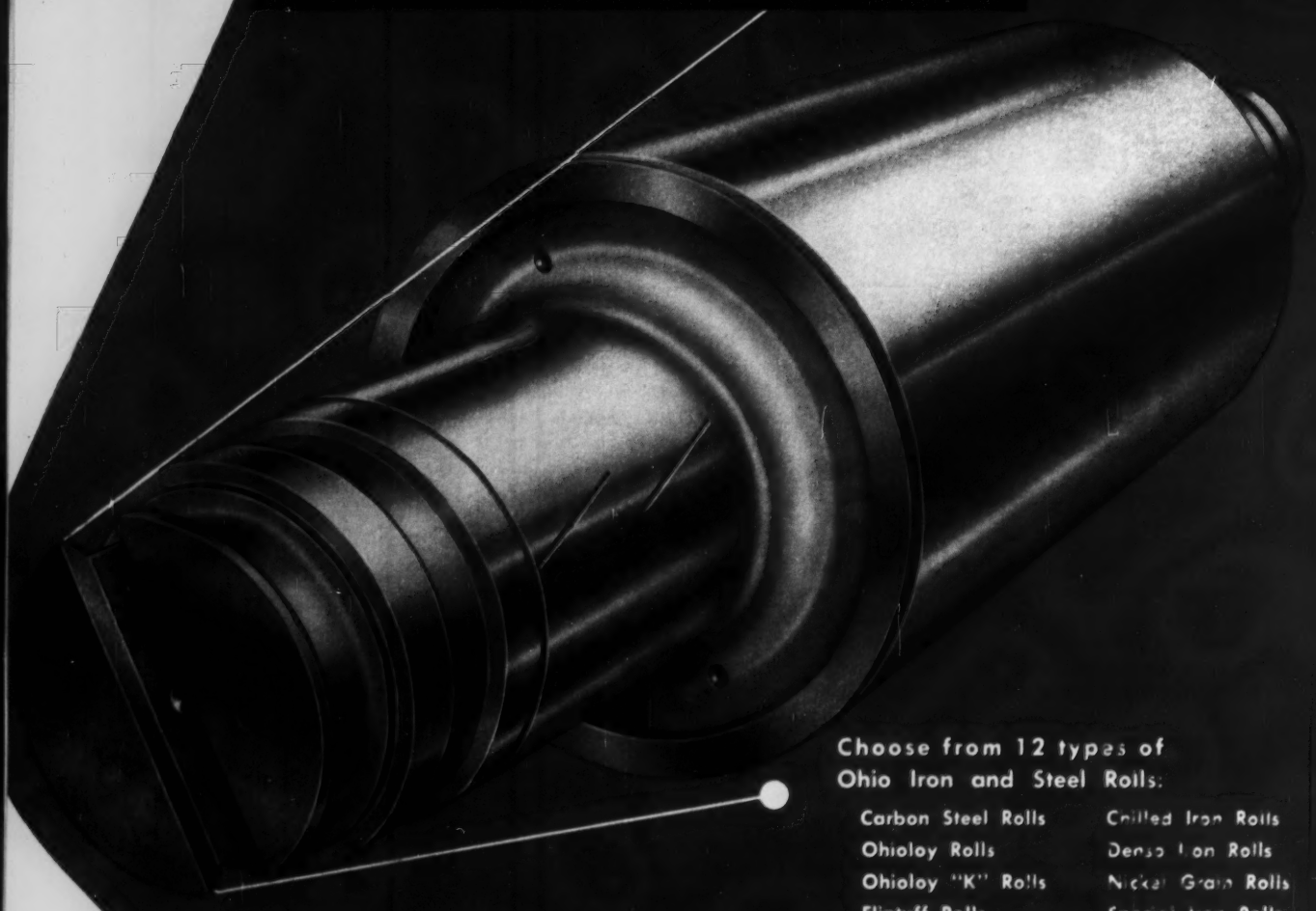

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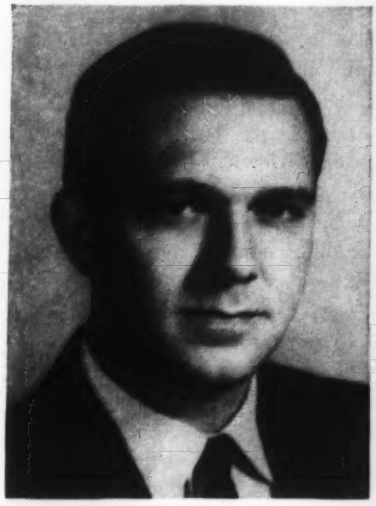

HUGH D. CONNELL
. . . Acme Steel mgr., project eng.

Hugh D. Connell, a project engineer in the new product and improvement division of **Acme Steel Co.,** Chicago, was made manager, project engineering department.

W. M. Dreier was made vice president - sales, **Massey-Harris-Ferguson Inc.,** Racine, Wis. He succeeds **L. M. Sweeney,** now vice president for special assignments. Mr. Dreier was general sales manager, Massey-Harris Division. **E. F. Klein,** Springfield, Ill., branch manager, becomes general sales manager and **Howard C. Steffen,** Indianapolis branch manager, was named to the new post of assistant general sales chief.

Wagner Iron Works, Milwaukee, promoted **James G. Dean** to vice president and assistant to the president. He is succeeded as vice president - sales by **William J. Schlapman,** former sales manager, tractor loader division.

Richard S. Miles was made vice president-operations at the Los Angeles plant of **Coil Plate Sheet Steel Corp.**

Robert B. Meneilly and **Donald K. Wright** were made assistant managers, tin plate sales, at Pittsburgh for **United States Steel Corp. W. Kenneth Dorman** was made assistant manager, slag sales. **Gladstone C. Hill** succeeds Mr. Wright as Indianapolis district sales manager.

DIETRICH TIMMERMAN
. . . chief eng., Birdsboro rolling mill

Dietrich Timmerman was made chief engineer, rolling mill department, **Birdsboro Steel Foundry & Machine Co.,** Birdsboro, Pa. He was formerly with Continental Foundry & Machine Co. Before coming to the U. S. in 1951, Mr. Timmerman was associated with several German rolling mill manufacturers and European steel plants.

Joseph R. Hager Jr. was elected vice president and director of manufacturing, **Gar Wood Industries Inc.,** Wayne, Mich. He joined the firm in January as director-manufacturing and formerly was with Baldwin-Lima-Hamilton Corp. at Eddystone, Pa.

Andrew S. Ryan was elected vice president-sales, **Virginia Steel Co.,** Richmond, Va. He was comptroller and personnel manager.

Stephen Pishko was made superintendent, major alloys division, at the Niagara Falls, N. Y., plant of **Electro Metallurgical Co. Arnold H. Soeder** becomes assistant superintendent and **Paul Prozeller,** assistant works engineer. **Clifford C. Whiting** transfers to Electromet's West Virginia alloy plant as plant metallurgist.

Charles W. Mason was made manager of production at **Solar Aircraft Co.'s** Des Moines, Iowa, plant. He was production superintendent.

GALE BLAKESLEE
. . . G. S. Blakeslee president

Gale Blakeslee was elected president, **G. S. Blakeslee & Co.,** Chicago. He succeeds **G. R. Blakeslee,** now chairman. **M. B. Pickett** was elected vice president-industrial division sales.

Charles F. Lloyd Jr. was appointed manager of aluminum products of **Fort Duquesne Steel Co.,** Pittsburgh. He was an industrial salesman in the Pittsburgh office of Aluminum Co. of **America.**

Joseph H. Coleman was made plant manager, **Firth Machine & Tool Inc.,** Fostoria, O.

Donald E. Cummings was made manager, steel mill sales division, **Air Products Inc.,** Allentown, Pa. He replaces **Arthur E. Steele,** now on special assignment.

Sharon Steel Corp., Sharon, Pa., created new sales groups. **Louis K. Whitcomb** is director of the market research division. **Robert A. Atkins** heads the plate and high strength steel division.

Alfred D. Stevens was appointed assistant general manager of **Willey's Carbide Tool Co.,** Detroit, responsible for the newly expanded carbide metal manufacturing division. Mr. Stevens formerly served as quality control manager of Kennametal Inc.

Matthew F. McCarthy retired as

RUSSELL S. STRICKLAND

FRANK E. HALDERMAN

. . . executive positions at Federal-Mogul-Bower Bearings

vice president of **Erie Forge & Steel Corp.**, Erie Pa.

Courtlandt S. Gross was elected president of **Lockheed Aircraft Corp.**, Burbank, Calif. He was executive vice president. He succeeds **Robert E. Gross,** who continues as chairman and chief executive. Changes are effective Oct. 1. Three senior vice presidencies established are filled by **C. A. Barker Jr.**, now vice president-finance and treasurer; **Cyril Chappellet,** vice president-administration; and **Hall L. Hibbard,** vice president - engineering. **Carl B. Squier,** a vice president, will also act as assistant to the chairman. **Daniel J. Haughton** succeeds Mr. Gross as executive vice president and is replaced by **A. C. Kotchian** as vice president-general manager, Georgia division.

Thomas S. Teague was made manager of materials in the manufacturing section of **General Electric Co.'s** metallurgical products department, Detroit. He was supervisor of the Malta Flight Propulsion Laboratory, Aircraft Gas Turbine Division, Evendale, O.

National Vulcanized Fibre Co., Wilmington, Del., appointed **E. B. Burnley** sales manager of its Kennett line of material handling receptacles manufactured at Kennett Square, Pa. He succeeds the late **Robert A. Craig.** Mr. Burnley continues as staff assistant to Roy S. Fisher, National's general sales manager.

Russell S. Strickland was elected vice president-sales, **Federal-Mogul-Bower Bearings Inc.**, Detroit. Former general manager, Bower Roller Bearing Division, he is succeeded by **Frank E. Halderman,** division controller. **William E. Calder,** industrial relations director, will act as executive assistant to Mr. Halderman.

David E. Neustadt was named vice president and marketing director, **National Metal Abrasive Co.**, Cleveland. He was general sales manager, W. W. Sly Mfg. Co.

J. R. Matullo was made New Jersey branch manager for **Worthington Corp.**, Harrison, N. J.

Harold R. Kohl was named manager of manufacturing engineering at **General Electric Co.'s** Erie, Pa., foundries.

Harold W. Schaefer was appointed vice president and general manager of **Philco Corp.'s** appliance division, Philadelphia. He succeeds **Raymond A. Rich,** resigned. **Larry F. Hardy** was made vice president in charge of consumer product divisions.

Arthur L. Goeschel was made manager of the Santa Rosa plant of **NRC Metals Corp.**, which is now under construction near Pensacola, Fla.

Roland E. Durocher was named assistant manager of **Jones & Laughlin Steel Corp.'s** Minnesota Ore Division. He has headquarters at Virginia, Minn.

Donald P. Ridgeway fills the new post of manager, spiroid department, **Illinois Tool Works,** Chicago.

A. J. Dougherty was made production manager, Napa, Calif., fabricating division, **Kaiser Steel Corp.**

William H. Wood was named assistant sales promotion manager of **Lockheed Aircraft Corp.**, Burbank, Calif.

John P. Day was made technical director of the San Diego, Calif., facility of **Marvelco Electronics Division,** National Aircraft Corp.

William M. Smart was appointed a vice president, **Union Carbide Nuclear Co.**, a division of Union Carbide & Carbon Corp., New York.

Arthur F. Osseck was made assistant purchasing agent, **White Diesel Engine Division,** White Motor Co., Springfield, O. He held a similar position with Nordberg Mfg. Co.'s Busch-Sulzer Division.

Thomas E. Snyder, sales manager of the Detroit warehouse of **Jones & Laughlin Steel Corp.**, was named acting manager of that operation. He succeeds **Lawrence Roehm,** who, for reasons of health, is on an extended leave of absence. **Clarence J. Pistor** was named assistant manager of the New Orleans warehouse. **William H. Boothe,** sales manager of the Hamilton steel warehouse in Cleveland, was named manager of the Lancaster warehouse.

Dr. Irven Travis, vice president-research, **Burroughs Corp.**, Detroit, was named vice president-research and engineering. **Raymond G. Bower,** vice president-engineering, retired.

Sid Mitwol was named midwest sales manager for the Sel-Rex equipment of **Bart-Messing Corp.** He has headquarters in Detroit.

Raymond J. Wilcoxon was made safety supervisor for Republic Steel Corp.'s **Berger Division,** Canton, O.

Milton A. Sanders joined the field sales staff of the Plastics Molding Equipment Division, **F. J. Stokes**

Large OD Thin Wall Tubing offers New Answers to Design Problems

Superior specializes in an unusually wide range of analyses, shapes and sizes

Today's design engineers are finding large OD thin wall tubing by Superior answers more and more of their design problems. Its light weight makes it ideal for ducting, fuel and oil lines in aircraft. Thin wall tubing also functions efficiently as a low pressure heat exchanger tube. Because of its close tolerances, ductility, and bright, clean OD and ID surfaces, Superior thin wall tubing is an excellent choice for flexible metal hose for the food, chemical and aircraft industries. Other applications include bellows, solenoid cylinder cores, cylinder liners for automobile hydraulic brakes, fractional horsepower motor casings, ceramic drills, electron power tube anodes and cathodes, and casings for radioactive well logging instruments.

A number of analyses in large OD thin wall seamless and Weldrawn® tubing are available at Superior. Stainless, carbon and alloy steels, beryllium copper, titanium, nickel and nickel alloys are offered in sizes up to 1⅛" OD with .035" wall maximum; Monel and certain analyses of stainless steel in sizes to 2½" OD with .025" wall maximum.

Superior tubing can be supplied in random, multiple or cut lengths up to 30 feet, and in any of three standard tempers (fully annealed, soft; half-hard drawn; full-hard drawn) or in special tempers required by Government, aircraft and customer specifications. Thin wall tubing can be shipped in special cardboard cylinders, to protect it from dents and scratches.

For additional information, get your free copy of Data Memorandum No. 4. Write to Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010" to ⅜" OD—certain analyses in light walls up to 2½" OD

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GERHARD REETHOF
. . . Vickers chief of research

SAMUEL STORCHHEIM
. . . Martin Co. nuclear div. post

B. I. ULINSKI
. . . Automatic Transportation post

Corp. He will work out of the New York district office.

Gerhard Reethof was named chief of research and **LeRoy D. Taylor**, assistant chief engineer for development at **Vickers Inc.**, Detroit. They will assist **Duncan Gardiner**, director of research and development.

H. Wisner Miller Jr. was elected a vice president of **International Business Machines Corp.**, New York. He is general manager, IBM Electric Typewriter Division.

Hershey Motorstokor Inc., Manheim, Pa., elected **John D. Wentz** president.

Norman L. Harvey was made operations manager for tube activities of **Sylvania Electric Products Inc.'s** electronics division. He has headquarters in Woburn, Mass.

Samuel Storchheim was made chief of manufacturing engineering and research in the nuclear division of **Martin Co.**, Baltimore.

James H. Giles Jr. was named to the research and development staff of **O. Hommel Co.**, Pittsburgh. He will engage primarily in development of low-firing ceramic finishes on steel and other metals.

Richard R. Kesti was made chief engineer of both **Valvair Corp.** and **Sinclair-Collins Valve Co.**, Akron.

Jens F. Louv Jr. was appointed sales manager, **Consolidated Diesel Electric Corp. of Canada Ltd.**, Toronto.

Dr. Pio Franco Martinuzzi was appointed technical consultant to the vice president-engineering at **Ford Instrument Co.**, Long Island City, N. Y.

B. I. Ulinski was appointed director of development and design at **Automatic Transportation Co.**, Chicago. **Raymond E. Orton** was made manager, product engineering department. He resigned as general manager, Orton Crane & Shovel Co.

G. E. Hutchinson fills the new post of quality control manager at **Rem-Cru Titanium Inc.**, Midland, Pa. Former assistant sales manager, he was in charge of process engineering and control in the production department, 1951 to 1954.

T. M. Linton was appointed Philadelphia district manager for **National Electric Products Corp.** to succeed **L. T. Clark**, who, due to ill health, has been relieved of managerial duties but remains with the firm as special sales representative in the Philadelphia district.

OBITUARIES . . .

John Thomas, retired engineering consultant and former vice president - engineering, **Alco Products Inc.**, Schenectady, N. Y., died Aug. 31.

Rudolf Feitl, 57, technical supervisor, **Waldes Kohinoor Inc.**, Long Island City, N. Y., died Aug. 30.

Jack W. Thomas, general plant engineer, **Joy Mfg. Co.**, Pittsburgh, died Sept. 5.

Benjamin Komins, 62, a founder and president of **Penn Tool Co.** and **HP Tool Mfg. Corp.**, Philadelphia, died Aug. 29.

Harold L. Reeder, 53, former production manager and plant superintendent, **Electric Auto-Lite Co.**, Toledo, O., died Aug. 30.

Albert E. Overton, 68, founder and president, **Safety Socket Screw Co.**, Chicago, died Aug. 30.

William Metcalf Jr., 86, a former president of **Braeburn Alloy Steel Co.**, a founder of **Wyckoff Steel Co.** and a past president of **Lava Crucible Co.**, died Aug. 31 at Sewickley, Pa.

Joseph G. Shryock, 76, retired president, **Belmont Iron Works**, Philadelphia, died Aug. 29.

Thomas Phillips, 69, retired vice president, **Westinghouse Electric Corp.**, died Sept. 9 in Legonier, Pa.

FOURTH OF A SERIES

Customer's Report

"Lee Wilson Single-Stack Annealing Furnaces boost our production per man hour by 60%"

"We've found the new Lee Wilson Single Stack Furnaces have raised production by 60 percent without increasing the number of operating personnel." This from the head of an annealing department that recently installed a complete Single Stack Annealing System.

The reasons: fuel input is doubled—as much as 5 million BTU per hour; improved convection systems distribute this high heat at tremendous velocities—thus the charge comes to heat faster. Forced cooling systems reduce the cooling down period—each base delivers 20 percent more productivity.

The Lee Wilson Single Stack System is the only modern system—specifically designed to meet the demands of tomorrow's production requirements.

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS

Lee Wilson* **ENGINEERING COMPANY, INC.**

20005 WEST LAKE ROAD • CLEVELAND 16, OHIO

SINGLE-STACK RADIANT TUBE ANNEALING FURNACES

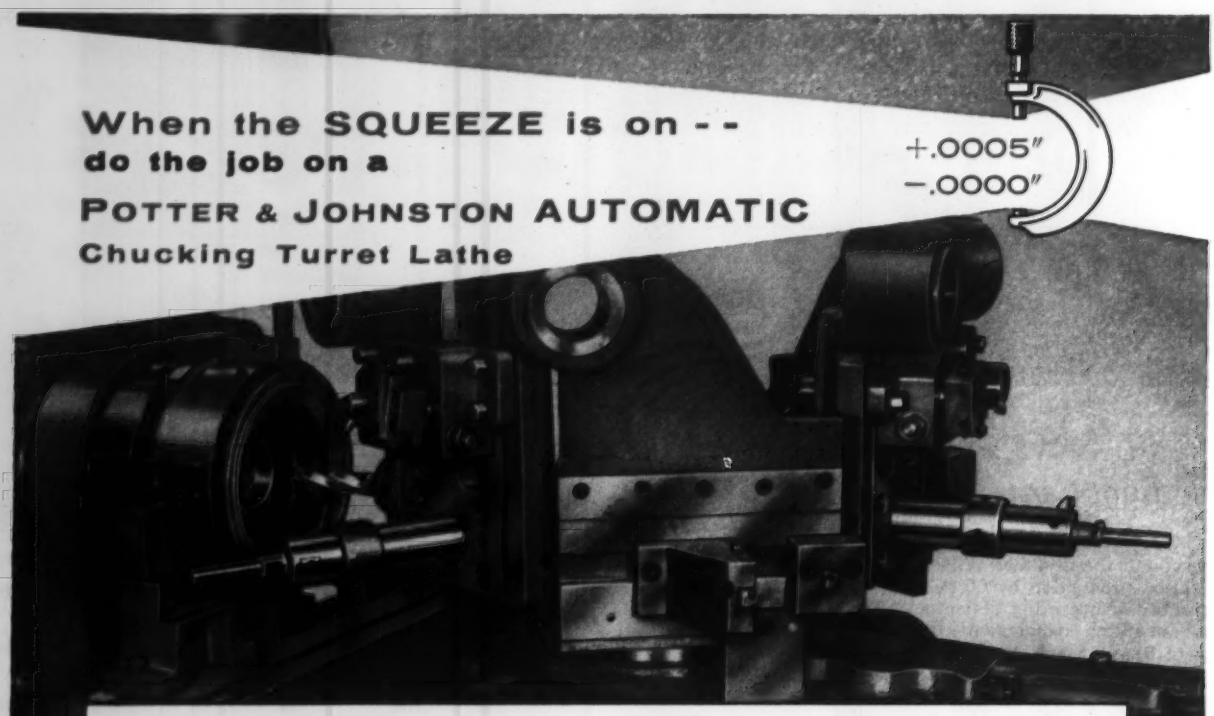
MAKE THE BEST METALS BETTER

9930

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES

The trend is to single stack. One of the nation's largest annealing departments recently put into operation 24 Lee Wilson Single Stack Furnaces and 72 bases.

When the SQUEEZE is on - - do the job on a POTTER & JOHNSTON AUTOMATIC Chucking Turret Lathe



a job like this, for example . . .

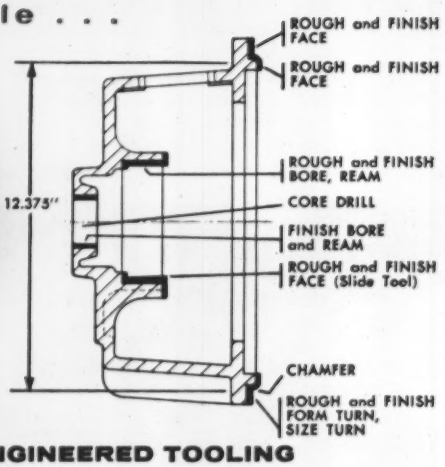
BEARING BRACKET
CAST IRON

involving . . .

15 separate close-tolerance cuts including one diameter held to

HALF A THOUSANDTH !

was finish machined - -



In just 4.31 minutes on a P&J 5-DELX AUTOMATIX with P&J-ENGINEERED TOOLING

More and more jobs are calling for really close tolerances and fine finishes *plus* far faster production rates. Yes – today's higher standards mean the squeeze is on most of the time; these days you're expected to handle, as routine, jobs that were considered "specials" only a couple of years ago. There's just one way to beat the squeeze . . . profitably! Re-equip with Potter & Johnston Automatics that have the extra speed, power rigidity and versatility it takes to produce faster, more accurately and more economically. And team the machine with P&J-Engineered Tooling that takes full advantage of combined cuts and faster-biting carbide tools to reduce machining time to a minimum.

Write for literature or phone the Pratt & Whitney Office near you, and ask a Direct-Factory Representative to call and discuss your requirements. Potter & Johnston Company, Pawtucket, Rhode Island (Subsidiary of Pratt & Whitney Company, Inc.)

POTTER & JOHNSTON

Precision Production Tooling for More Than Fifty Years

AUTOMATIC CHUCKING TURRET LATHES

Enters Tubing Field

Successor to H & H Machine Co. will engage in basic forming operations on metal tubing

FABRICATION of tubular metal products will be the specialty of H & H Machine Co. Inc., Norristown, Pa. The new company is successor to H & H Machine Co., founded in 1950 to design and manufacture tools and dies.

Engaging in basic forming operations on tubing (size range: smaller than a hypodermic needle —0.01 in.—to 5/8-in. in diameter), the newly formed corporation has the facilities for cold working a wide range of metals and alloys, including aluminum, copper, nickel and steel.

Forming techniques to be employed by H & H Machine will include beading, flaring, flanging, spinning, bending, upsetting, swaging, drawing, reducing, expanding and combinations of these operations. The formed tubing will be used in instruments, electrical appliances, electronic equipment, airplanes, surgical and dental instruments, as well as for general industrial applications.

Black & Decker Opens Branch

Black & Decker Mfg. Co., Towson, Md., opened a sales and service branch at 1506 Grand Ave., Phoenix, Ariz. Barry R. Agenbroad is manager of the branch. The Los Angeles and Phoenix branches are under the over-all management of R. E. Stone, district manager of the firm's Industrial-Automotive Division.

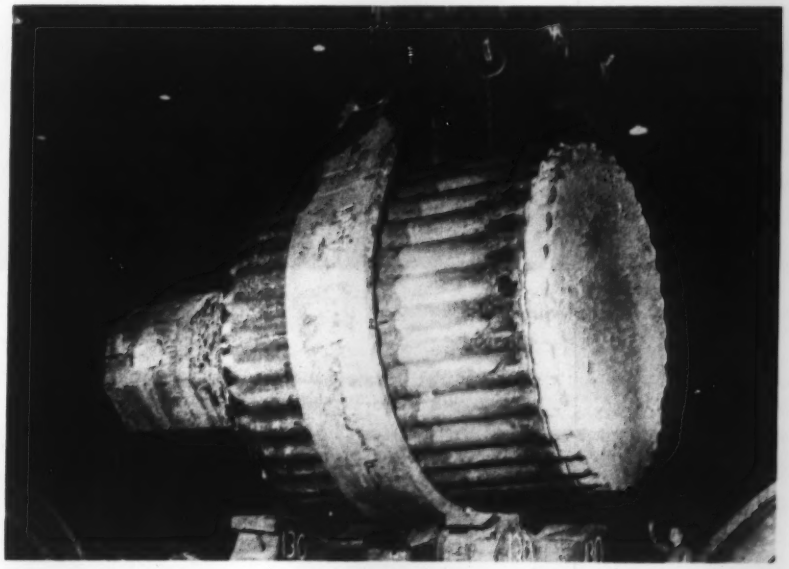
Fastener Firm Expands

Tubular Rivet & Stud Co., Boston, is building a branch office and warehouse at 6610 W. Dakin St., Chicago. The structure is scheduled to be occupied Oct. 15. The company makes rivets and riveting machines, staples and many other types of fasteners.

Budd Licenses Canadians

Stainless steel passenger cars, railway disc brakes and Budd's Rolokron will be made by Canadian Car & Foundry Co. Ltd., Montreal, Que., under license of Budd Co., Philadelphia. Canadian Car is a

(*Please turn to page* 122)



Huge Ingot Will Be Forged Into Hydroelectric Shaft

This huge 516,560-lb ingot, one of the largest ever cast at U. S. Steel's Homestead District Works, will be forged, heat treated and machined at the plant's forging division before shipment as a hydroelectric shaft for the St. Lawrence Seaway project. Ingot is being transferred from railroad car to reheating furnace

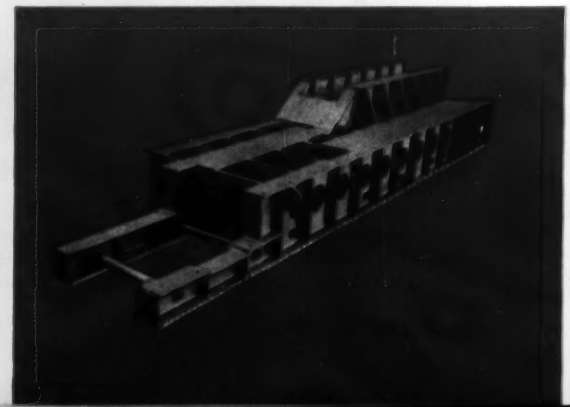
MUNDT
PERFORATED
METAL
MEANS
PERFECT
SCREENS

Specially
Fabricated for
ALL INDUSTRIES
BY
CHARLES MUNDT & SONS
53 FAIRMOUNT AVE.
JERSEY CITY 4, N. J.
PHONE—DELAWARE 3-6200
Send for Illustrated Catalog

CONTINENTAL high-speed 21"x53"x60", 4-stand tandem cold mill in the Gibraltar Plant of the McLouth Steel Corporation.

CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

WELDMENTS—fabricated steel plate, or cast-weld design.



BLAW-KNOX
makes what it takes
to cold roll
at high speeds

In the Gibraltar Plant of McLouth Steel, this modern CONTINENTAL 60-inch, 4-stand tandem cold mill rolls steel at delivery speeds in excess of 3,000 fpm.

Designed to meet specific customer requirements, the mill has interesting features, such as—(1) entry and delivery coil conveyors of this cold strip mill, and two single-stand skin-pass mills, are at floor level—which provides greater safety, more efficient handling and easy inspection of all coils during processing. (2) mill equipment has built-in raceways to carry the electrical cables—which simplified the installation and provides easy access for maintenance.

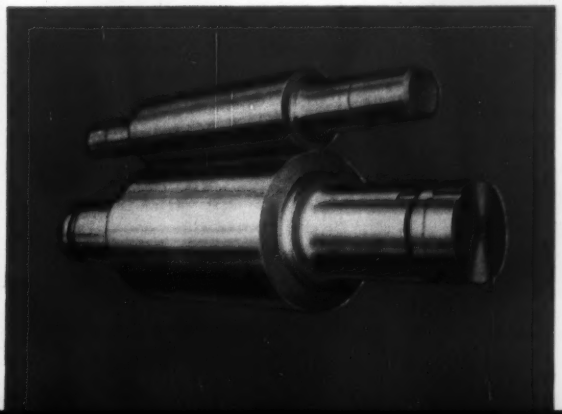
BLAW-KNOX designs and builds *complete* rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

BLAW-KNOX COMPANY
Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . Including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills . . . roll lathes • chippers • special machinery • and complete auxiliary equipment.

ROLLS—Iron, alloy iron and steel rolls for all types of rolling mills.



50th Anniversary
BLAW-KNOX
1906-1956

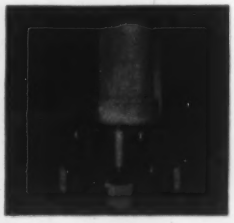
Advances in Applied Radiation

DEVELOPMENTS in APPLIED RADIATION ENERGY, its APPLICATIONS and the APPARATUS USED TO PRODUCE IT

SUBSTANTIAL SAVINGS in time and money are being gained with circumferential radiography — a technique exploited by the unique features of the Van de Graaff supervoltage x-ray generator.

Instead of requiring separate exposures for many segments of a circumferential weld, the Van de Graaff's sideward-directed x-rays radiograph the entire seam *in a single exposure*, with excellent film density and sensitivity. Because of the very small focal spot, sharpness is retained even where short object diameters are involved.

The wide x-ray coverage of the panoramic beam is used with equal benefit in simultaneous radiography of groups of castings arranged in a circle; *only one exposure is required* to inspect a number of objects. Production radiography in applications previously considered impracticable results from Van de Graaff's speed and versatility.



For a complete analysis of the advantages of supervoltage radiography with the Van de Graaff, including case histories from American industry, write for our 24-page Bulletin R.

HIGH VOLTAGE ENGINEERING CORPORATION

7 UNIVERSITY ROAD CAMBRIDGE 38, MASSACHUSETTS

(*Concluded from page* 119)

subsidiary of A. V. Roe Canada Ltd. and a member of the Hawker-Siddeley group of England.

Chile Makes Electrodes

A complete line of welding electrodes is being made in Santiago, Chile, by a new company jointly owned by A. Montero y Cia. S. A. and Harnischfeger International Corp., Milwaukee.

Harnischfeger Export Corp. has licensed the company to make electrodes bearing the P&H name. Latin American customers will benefit from reduced freight rates and use of local currencies.

Rem-Cru Buys Land

Rem-Cru Titanium Inc. purchased 262 acres of land in Industry Township, Beaver county, Pa. C. I. Bradford, president of Rem-Cru, says a new research laboratory and administration office may be located on the site.

Stolper Builds Plant Addition

Stolper Steel Products Corp., Menomonee Falls, Wis., will build a 42,000-sq-ft addition to its plant, expanding manufacturing space by one-third. The firm makes sheet metal components on a job shop basis, as well as some sheet metal goods which it markets under its own name.

Dudley Steel Opens Branches

Dudley Steel Corp., Los Angeles, opened offices in Bakersfield and El Centro, Calif. The firm designs and manufactures commercial all-steel structures.

Baldwin Consolidates

Baldwin - Lima - Hamilton Corp. opened a $3-million plant to house its Electronics & Instrumentation Division under one roof. Three companies previously purchased by Baldwin—Ruge de Forest Inc., Cambridge, Mass.; O. S. Peters Co., Washington; and Sonntag Scientific Corp., Greenwich, Conn.—were consolidated into the Electronics & Instrumentation Division last year.

To this division has been added

FLEXIBLE TUBING
for the
STEEL INDUSTRY

On the strip mill . . . furnace doors . . . air, oil or fuel lines . . . engine exhausts . . . power lines Penflex Flexible Tubing has proved itself throughout the steel industry. Rugged . . . tough . . . flexible Penflex Tubing is made to stand the most severe usage.

From 1/8" to 24" I.D. . . . bronze, galvanized or stainless steel Penflex makes all types and sizes of flexible metal tubing. Penflex "Flexineering"—the science of applying flexible tubing to fit the particular needs of the steel industry—assures the right tubing on each installation.

When you require metal tubing that is tight as a pipe, but flexible . . . safe at high temperatures . . . and free from metal fatigue specify Penflex. Write for your copy of "Flexineering" today.

Pennsylvania Flexible Metallic Tubing Company, Inc.,
7219 Powers Lane, Phila. 42, Pa. *Branch Sales Offices:*
Boston • New York • Chicago • Houston • Cleveland
Los Angeles and Distributors in Principal Cities

PENFLEX

HEART OF INDUSTRY'S LIFELINES

the Testing Equipment Department of Baldwin's Eddystone Division.

Plans for Gear Plant Progress

Industrias Kaiser Argentina S. A. has concluded negotiations with Giuseppe Vianini, Italian manufacturer of gear equipment and head of the Argentine firm, for the purchase of gear manufacturing equipment at a value of more than 20 million pesos ($610,000). This ends the first stage of the firm's program for the installation of a complete and integrated gear plant. The firm is licensed by Borg-Warner International Corp. and Dana Corp. for the production of gear boxes, transmissions and transfer cases.

Vanadium-Alloys Goes West

Vanadium-Alloys Steel Co., Latrobe, Pa., has established a west coast firm to distribute warehouse stocks of high speed and tool steels.

Titled Vanadium-Pacific Steel Co., it will be based in the Los Angeles district at Maywood, Calif. R. P. Stemmler is its president.

Vanadium Corp. Adds Reserves

Vanadium Corp. of America purchased a one-third interest in a group of 27 mining claims (known as the Eagle Basin group), which extends over nearly 550 acres in the Long Park area of Montrose county, Colo.

The purchase adds to the company's uranium-vanadium ore reserves for operation of its nearby Naturita mill.

Marysvale Uranium Co. leased 42 claims to Vanadium on a royalty basis. They extend over 850 acres in the Marysvale, Utah, area —east of properties now operated by Vanadium.

Ashtabula Foundry Sold

Lake City Malleable Co.'s huge foundry plant in Ashtabula, O., has been sold to National Distillers Products Co. for conversion into a chemical plant.

Dorr-Oliver Leases Property

Dorr - Oliver Inc., Stamford Conn., has leased the West Pittston Iron Works building in West Pittston, Pa., and will begin operations there shortly. The company, with a plant in Hazelton, Pa., makes heavy process industrial filtration equipment.

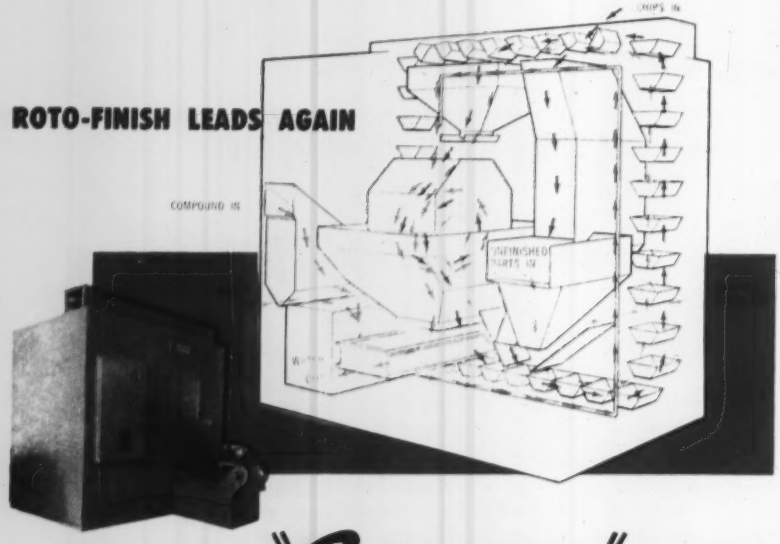
C. G. Hussey Opens Warehouse

C. G. Hussey & Co., a division of Copper Range Co., Pittsburgh, opened an enlarged warehouse in the Bond Hill section of Cincinnati. The company distributes stocks of copper and brass sheet, strip, rod, tubes, wire, bus bar, roofing products and allied nonferrous products.

Ryerson Sells Aluminum

Joseph T. Ryerson & Son Inc. is selling Reynolds aluminum in the area served by its New York plant. The facility has an automatic shearing line which produces flat roller-leveled sheets up to 16 ft long from coil stock. Slitting equipment converts 48-in. wide coil stock into narrower coils.

Other cutting facilities at the New York plant include squaring shears for making blanks from



the new "Rotomation" MACHINE

MAKES MECHANICAL TUMBLING A FULLY AUTOMATIC BARREL FINISHING PROCESS

- Completely Automatic
- Needs no operator in attendance
- Loads and unloads itself with each cycle.
- Cycle variable for different part requirements.
- Provides continuous operation
- Assures uniformity of finish
- Low cost operation — high production
- Complete package unit
- Simple to install . . . Electric, water, air and drain connections only.
- Suitable for straight line production.
- Thus, "Rotomation" barrel finishing machine becomes a machine tool.

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P. O. Box 988 – Phone 3-5578
ORIGINATORS OF THE ROTO-FINISH PROCESS

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

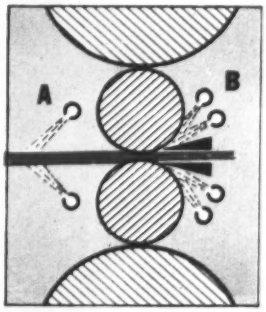
Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

Choosing work rolls for hot strip finishing trains

In continuous hot strip mill operation, the highest frequency of time-consuming roll changes usually occurs in the early stands of the finishing train. Conditions here are severe: the reductions taken are heavy, and the strip is still thick enough to carry much of its original heat.

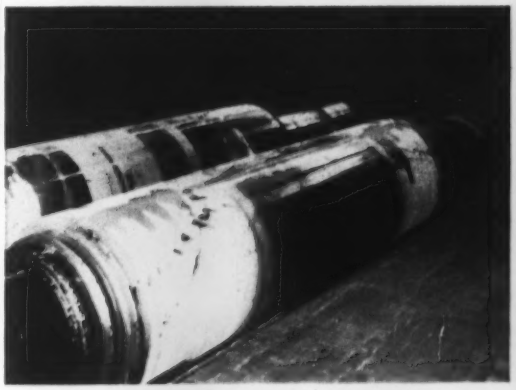
Water: the secret of longer roll life—Banding is a chief cause of premature roll failure in these stands. This peculiar tendency is related to the amount and size of graphite in a roll's surface, and to the adequacy of the cooling system. At high temperatures, graphite tends to pull out of the surface, leaving tiny fissures. Rolling pressure then forces in small particles of scale. These offer footholds for further scale build-ups, which are rapidly rolled into elongated bands.

Thus, cooling is vital. Water should be applied at a pressure of 140-to-200 psi, and in such a way that a large volume actually reaches the roll surface. The nozzle arrangement should be designed to create uniform cooling over the entire work surface. In some cases, additional sprays on the pass line are necessary.



EFFECTIVE WATER APPLICATION includes high-pressure sprays (A) aimed against the strip to push the scale out of the rolls and high-pressure water (B) in large quantities applied to the roll surfaces as close to the point of contact with the strip as the mill design permits.

Choice of rolls can make or break a rolling schedule—Where it is impractical to cool the rolls thoroughly, it is still quite possible to minimize roll changing by using Mack-Hemp *Midland Superalloy* rolls. These are nickel-chromium-molybdenum alloy steel rolls containing no graphite and capable of being heat treated to high hardness levels. As a result, they are extremely resistant to spalling and fire cracking, affording no foothold for scale.



ROLL BANDING on hot strip mill work rolls is a principal cause of uneven gage across the width of the strip. It brought about the early removal of this pair of rolls.

Where rolls can be adequately cooled, *Mack-Hemp Nironite "F"* double-poured high-nickel grain rolls actually will roll greater tonnages than alloy steel rolls. The indefinite chill of the first pour keeps the graphitic content of the iron low near the roll surface, while the second pour produces a strong, ductile core.

For less severe conditions, the *Mack-Hemp Nironite A or B* grades of grain roll give an excellent account of themselves. Although they show more graphite near the surface, they frequently turn in surprising tonnages between roll changes.

Mack-Hemp is as interested as you are in securing maximum output from your mills. If there are troublesome "roll-wreckers" among them, why not call upon us for help in selecting rolls to beat your special problems? There's no obligation. Write us today.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery

Four of six Ceco-Drops which replaced Board Hammers in a large automobile forge shop

·CECO-DROP·

The Ceco-Drop was selected because of better maintenance record and ease of operation

High production is maintained—there are no hazards to change—fewer adjustments to make

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The Ceco-Drop is safer and easier to operate. Leg fatigue is eliminated. There are no overhead hazards

Parts shown here are typical Ceco-Drop forgings

·CECO-DROP·

They are automobile shock absorber parts —gudgeon, anchor and arms

Have you the latest CECO-DROP bulletin? Write CHAMBERSBURG ENGINEERING COMPANY, Chambersburg, Pa.

sheets and saws for cutting rod and bar stock to length. Formed sheets for building panels also will be stocked.

Fruehauf Builds in Canada

Fruehauf Trailer Co. of Canada Ltd., plans a $3-million plant on a 71-acre site in Toronto, Ont. This addition of 240,000 sq ft of floor space will enable the company to increase capacity 50 per cent and serve the entire Canadian market from Canada.

Rust Engineering Opens Office

Rust Engineering Co., Pittsburgh, opened an office in Boston. Leonard A. Wasselle is manager.

CONSOLIDATIONS

Hydraulic Press Mfg. Co., Mt. Gilead, O., merged with **Koehring Co.**, Milwaukee (STEEL, June 25, page 76), and is now known as the Hydraulic Press Mfg. Co., a division of Koehring.

Food Machinery & Chemical Corp., San Jose, Calif., acquired **Hudson-Sharp Machine Co.**, Green Bay, Wis., manufacturer of wrapping machinery and specialized equipment for converting plastic films and paper.

Dr. J. E. Rosenberg, president of **Plasteel Products Corp.**, Washington, Pa., acquired controlling interest in **Clad Rex Steel Co.**, Denver, owner of a patented process for bonding vinyl plastic sheeting to metal.

Reynolds Metals Co., Louisville, purchased **Arrow Brands Inc.**, Long Beach, Calif., and will operate it as a subsidiary. Arrow Brands produces decorative aluminum foil.

American Optical Co., Southbridge, Mass., acquired **J. W. Fecker Inc.**, Pittsburgh, producer of astronomical equipment and optical devices for the military services. As part of the transaction, American Optical also acquired the assets of **Akeley Ca-**

(*Please turn to page* 130)

Whether it's the x-ray spectrograph utilized for chemical analysis . . .

. . . the automation gaging systems that provide positive, fully automatic control of steel strip thickness . . .

. . . or our all-new *metallurgical laboratory (replacing our previous lab facilities), fully staffed and equipped for metallurgical and chemical research, development and quality control . . .*

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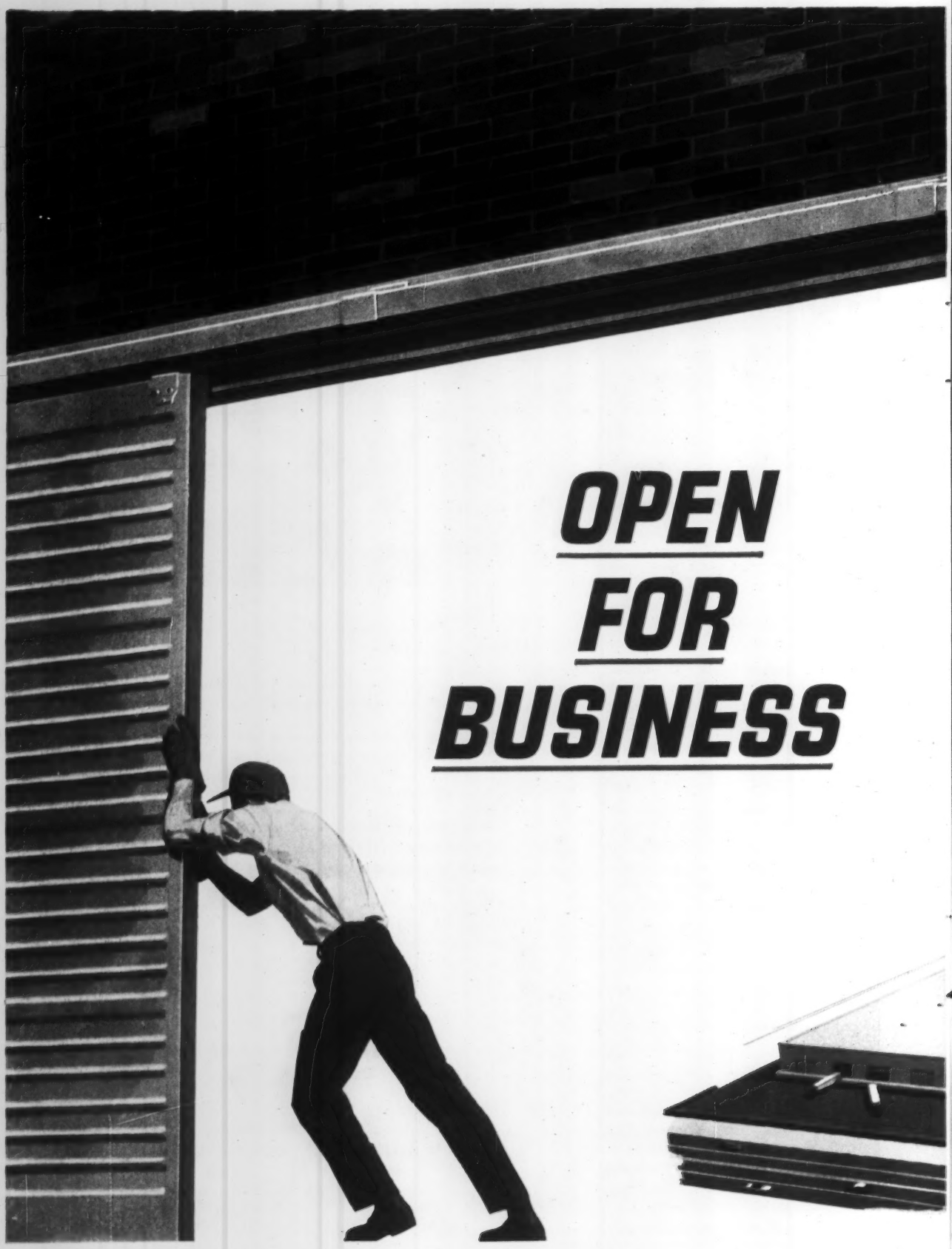

OPEN
FOR
BUSINESS

New refractories plant at Columbiana, Ohio, to give better-than-ever service to the steel industry!

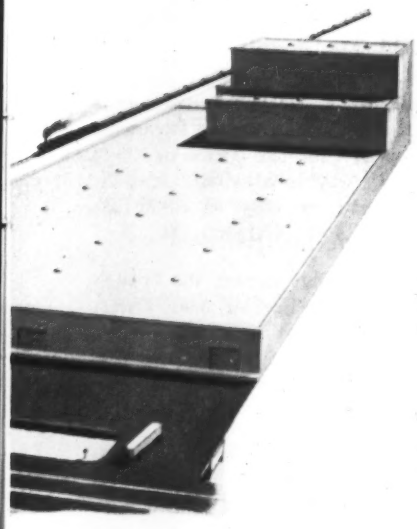
THE NEW Kaiser Chemicals refractory plant at Columbiana, Ohio has now begun production of steel furnace refractories.

Located on a 100 acre site adjacent to the main line of the Pennsylvania Railroad and the Ohio-Pennsylvania Turnpike, the new Columbiana plant assures rapid rail and truck transportation to steel producers in the Midwest and East.

Already serving the nation's steel industry from three plants in California, this new *Kaiser Chemicals* facility means new production to meet the increasingly heavy demand for Kaiser refractories. The new Columbiana plant will manufacture basic brick, mostly of the Periclase Chrome and Chrome Periclase types in addition to Permanente Ramming Mixes for refractory furnaces.

All these refractories are *especially designed* for peak performance in specific applications in open hearth and electric steel furnaces. In fact, for more than 12 years Kaiser Periclase Chrome and Chrome Periclase Brick have *set the standard* of performance for the industry. *That is why more and more steel producers regard them as the most dependable refractories available today!*

If you have a problem in your mill which might be solved by the *prompt delivery* of *superior quality, dependable refractories*, why not get in touch with us?



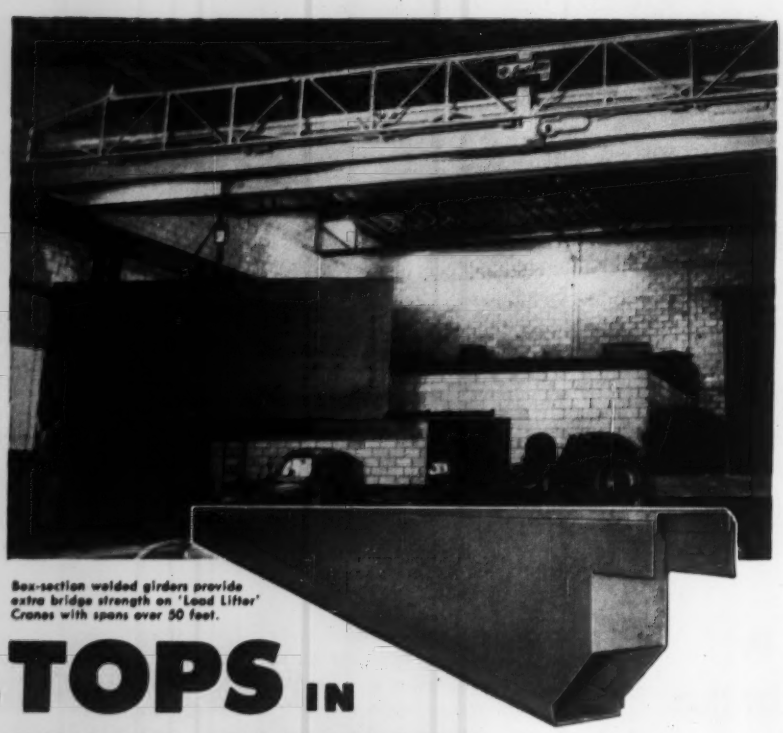
For more information call our nearest Sales Office: Kaiser Chemicals Division, 1924 Broadway, OAKLAND 12, Calif. . . . 3 Gateway Center, PITTSBURGH 22, Pa. . . . 518 Calumet Bldg., 5231 Hohman Avenue, HAMMOND, Indiana.

To obtain free copies of Kaiser Chemicals product literature write Kaiser Aluminum & Chemical Sales Inc., 1924 Broadway, OAKLAND 12, California, Dept. S6212.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Refractory Brick & Ramming Materials • Castables & Mortars • Magnesite Periclase • Deadburned Dolomite



Box-section welded girders provide extra bridge strength on 'Load Lifter' Cranes with spans over 50 feet.

TOPS IN CRANE SERVICE AND ECONOMY...at low prices

Here you see a typical Series "D" All-Electric 'Load Lifter' Crane. This Series differs importantly from all other brands available for average industrial service. Standardization and mass production methods permit the inclusion of design and construction features not combined in the most expensive cranes. Day-to-day operating and maintenance costs are minimized. Equally important, the initial investment is substantially lower than for other makes for comparable service.

Provided in Series "D" Cranes are plus values like these:

- Every practical use of anti-friction bearings to retard wear, to assure smooth operation.
- All gearing operates in oil to keep maintenance low.
- Double braking system to make accurate spotting easy.
- Positive magnetic control: Floor-operated cranes controlled by push button; cage-controlled cranes by master switches.
- Comparatively low headroom and high hook lift.
- Three-girder bridge on spans under 40 feet and box-section welded girders on longer spans to insure against whipping and skewing.

Series "D" All-Electric 'Load Lifter' Cranes are built in capacities from 1 to 20 tons. All provide complete safety for man, load and crane. Selection is easy. No complicated figuring. Just write for Catalog 221 and make your choice.

MAXWELL MANNING M&M MOORE INC TRADE MARK

'Load Lifter'® CRANES

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

(*Concluded from page 127*)

mera Co., New York, which was taken over by Fecker last year. The Akeley division produces precision equipment for the military and motion picture industry.

American Lubricants Inc. purchased **Machwirth Bros. Co.**, both of Buffalo, ornamental steel and sheet metal firm.

Jones & Lamson Machine Co., Springfield, Vt., acquired **Modern Tool Works**, Rochester, N. Y., formerly operated as a division of Farrel-Birmingham Co. Inc., Ansonia, Conn. Jones & Lamson plans to integrate the new line with its existing line of tools in the Thread Tool Division.

Litton Industries, Beverly Hills, Calif., will purchase **Triad Transformer Corp.**, Los Angeles. This will make Litton one of the nation's leading producers of electronic transformers, reactors, toroid coils, electronic wave filters and related products. Triad also is a maker of miniature and subminiature transformers designed especially for use with transistors.

Remington Arms Co., Bridgeport, Conn., purchased **Mall Tool Co.**, Glendora, Calif.

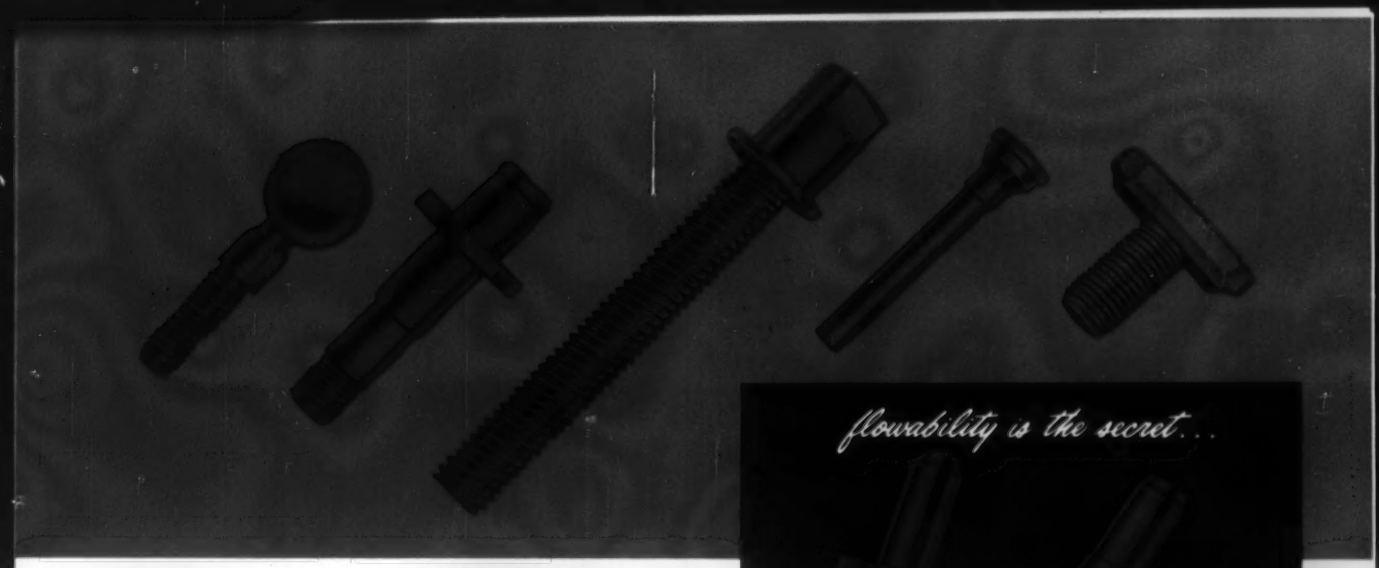
Haverly Electric Co. Inc., Syracuse, N. Y., merged with **John Wood Co.**, New York, manufacturer of farm and home equipment.

NEW ADDRESSES

Holcroft & Co., Detroit, manufacturers of heat treating furnaces, announces that the office of their Chicago representative, A. A. Engelhardt, is now at 4935 W. Fullerton Ave., Chicago 39, Ill.

Micro Switch moved its branch office to 1900 Superior Ave., Cleveland 14, O. Micro Switch, Freeport, Ill., is a division of Minneapolis-Honeywell Regulator Co., Minneapolis.

Curtiss-Wright Corp., Wood-Ridge, N. J., opened a branch sales office at 208 S. LaSalle St., Chicago, Ill.



Pheoll MANUFACTURING CO.
saves customers dollars by cold heading parts.

A recognized leader in the cold heading process field, Pheoll Manufacturing Company, Chicago, Illinois, is constantly striving to simplify and standardize fasteners for their customers. Working closely with Keystone Steel & Wire Company, Pheoll Fastener Redesign Department has developed cold heading processes that in many instances have saved 20% to 50% in time and money over other methods of manufacture.

This is another example of how alert manufacturers, like Pheoll, are cutting costs, eliminating rejects and increasing die life with Keystone "XL" Cold Heading Wire. Your Keystone Wire Specialist will show you how the *flowability* characteristics, uniform high quality and economy of Keystone "XL" Wire can help you, too. Talk over your problems with him.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

Pheoll Redesigns
Stud, Uses Keystone "XL"
to Cut Manufacturing Costs 50%

The heavy stud on the left was designed and manufactured from "XL" Cold Heading Wire by Pheoll to take the place of an equivalent part produced by other methods of manufacture. Savings to the customer amounted to 35%. The lighter stud is a further Pheoll design improvement on the same part that accomplished a savings of 50% over the original manufacturing process.

KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

Mail coupon for free booklet—
COLD HEADING FACTS! Discusses methods, technical facts, wire requirements and other data.

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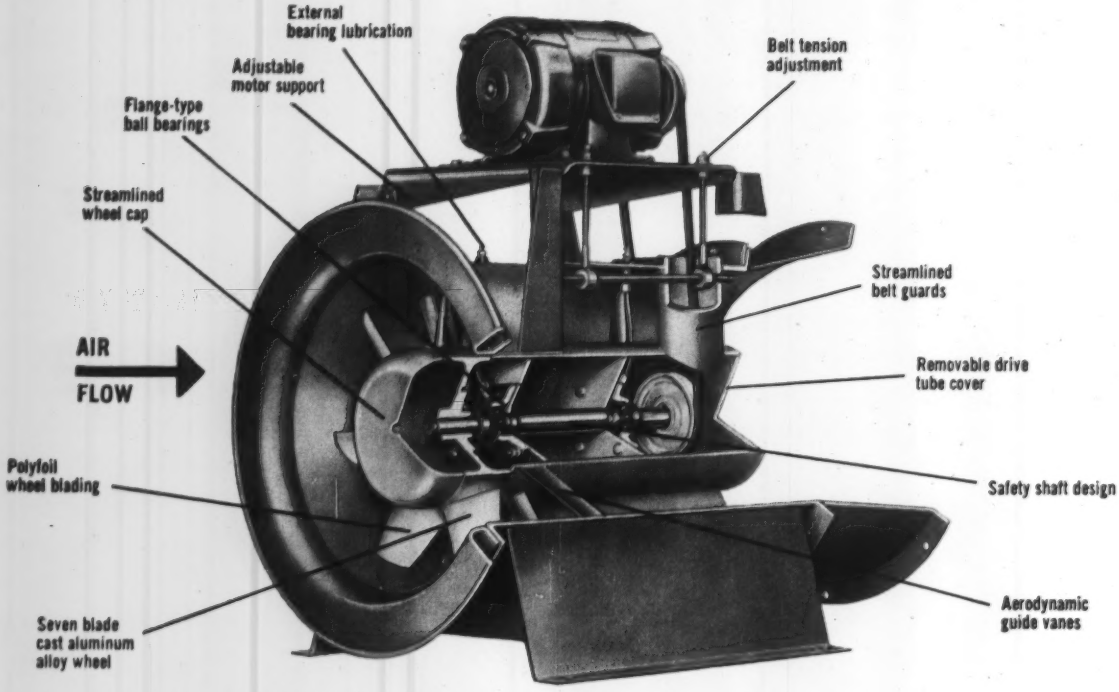
NEW Improved Westinghouse Axial Flow Fans

for Industrial air, fume, vapor handling jobs!



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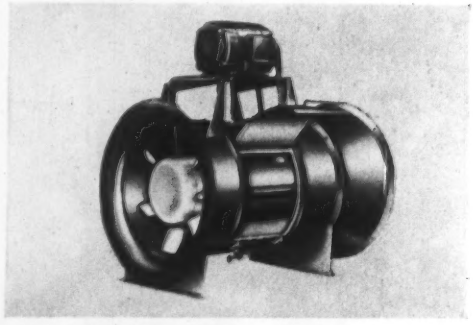
COMPLETE NEW LINE

With: volumes from 1,700 to 100,000 CFM—static pressures up to 3¼"—14 sizes, Vaneaxial or Tube Axial, direct-connected or V-belt driven, with wheel diameters from 15" to 72".

- **Space Saving** . . . compact Axial Flow design permits installation directly into duct work.
- **Improved performance** . . . non-overloading horsepower feature permits use of smaller motors.
- **Least maintenance** . . . rugged practical construction insures continuous trouble-free operation.

For complete application service, call your nearest Sturtevant Sales Engineer, or write Westinghouse Electric Corporation, Sturtevant Division, Dept. 4J, Hyde Park, Boston 36, Mass.



Spray booth Vaneaxial Fan specially designed to provide easy access required for paint spray exhaust!

WATCH WESTINGHOUSE!

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STEEL
The Metalworking Weekly

September 17, 1956

Iron & Steel Show Section

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- What Steelmen Are Saying—154

Steel Ingot Capacities: Where They're Being Increased

Company	Place of Expansion	Ingot Expansion (Net tons)	Type of Steelmaking Facilities	Completion Date
U. S. Steel Corp.	Gary, Ind.	790,000	Improve open hearths	
	South Chicago, Ill.	550,000	Improve open hearths	
	Geneva, Utah	380,000	Enlarge 10 open hearths	
	Other plants	780,000		
Total		2,500,000		By end of 1958
Bethlehem Steel Co.	Bethlehem, Pa.	500,000	Improvements and modernization	
	Lackawanna, N. Y.	500,000	Rebuild 1 open hearth and add 1 open hearth	
	Sparrows Point, Md.	2,000,000	Rebuild open hearths and add 7 open hearths	
Total		3,000,000		By August, 1957
Republic Steel Corp.	Chicago	372,000	Replace 3 electric furnaces	
	Cleveland	792,000	Enlarge open hearths and add 2 open hearths	
	Gadsden, Ala.	204,000	1 new electric furnace	
	Warren, O.	408,000	2 new electric furnaces	
Total		1,776,000		By mid-1957
Jones & Laughlin Steel Corp.	Aliquippa, Pa.	300,000	Install 2 oxygen converters	
	Cleveland	400,000	Improve open hearths and add 2 electric furnaces	
Total		700,000		1957
National Steel Corp.				
Great Lakes Steel Corp.	Detroit	650,000		
Weirton Steel Co.	Weirton, W. Va.	350,000	Includes addition of 1 open hearth	Mid-1959
Total		1,000,000		
Youngstown Sheet & Tube Co.	Youngstown			
	Campbell, O.			
	East Chicago, Ind.			
Total		1,000,000	Enlarge open hearths, improve handling facilities, improve practices	Early 1958

Steel Expansion Rolls Along

STEEL INGOT production capacity has risen approximately 1 million net tons this year through expansion projects. It will continue to go up as other projects progress.

In addition, there will be capacity increases through improvement of steelmaking practices.

By next Jan. 1, the country's ingotmaking capacity should be 3.6 million net tons larger than it was on Jan. 1 of this year. (It then was 128,363,090 net tons.) The capacity increase last year, before the current expansion program started, was 2,534,780 net tons.

Expanding Expansion—Ingot expansion programs now under way or announced total 14,309,700 net tons (see table above). Last March, there were 14,216,700 tons under way or announced (STEEL, Mar. 5, p. 62 and 63).

More projects will be announced. It's estimated that an average of 4 million ingot tons will be added each year until 1970. A number of projects are in the planning stage and would be announced promptly if the government would again permit fast tax amortization on steelmaking facilities. The government is studying the advisability of setting up a program of fast tax write-offs for them, but a decision on it is unlikely before sometime in October—perhaps later.

A Queue—To get in line for any fast tax write-offs that may be permitted, steel producers have filed applications in Washington for $781.2 million worth of projects. That sum includes some finishing facilities, as well as primary steelmaking facilities.

Of the 14,216,700 tons of capacity listed in STEEL's scoreboard

Company	Place of Expansion	Ingot Expansion (Net tons)	Type of Steelmaking Facilities	Completion Date
Inland Steel Co.	Indiana Harbor, Ind.	800,000	Add 3 open hearths	By 1959
Armco Steel Corp.	Middletown, O.	210,000	Add 1 open hearth	
	Sheffield Steel Div.	420,000	Add 3 electric furnaces—one each at Kansas City, Mo., Sand Springs, Okla., and Houston	
Total		630,000		1957
Colorado Fuel & Iron Corp.	Pueblo, Colo.	200,000	Add 1 open hearth	First quarter, 1957
Wheeling Steel Corp.	Steubenville, O.	270,000		1957
Sharon Steel Corp.	Farrell, Pa.	100,000	1 new electric furnace	Late 1957
Kaiser Steel Corp.	Fontana, Calif.	614,000	Install 2 65-ton oxygen converters	1958
Crucible Steel Co. of America	Midland, Pa.	72,000	Open-hearth improvements	1956
Pittsburgh Steel Co.	Monessen, Pa.	180,000	Open-hearth improvements	March, 1957
Detroit Steel Corp.	Portsmouth, O.	160,000	Add 1 open hearth	1956
Granite City Steel Co.	Granite City, Ill.	504,000	Open-hearth improvements	By late 1958
Northwestern Steel & Wire Co.	Sterling, Ill.	250,000*	Add 1 electric furnace*	
Alan Wood Steel Co.	Conshohocken, Pa.	175,000	Add 1 open hearth	October, 1956
Copperweld Steel Co	Warren, O.	41,620	Electric furnace improvement	By end of 1956
Lone Star Steel Co.	Lone Star, Tex.	137,500	Add 1 open hearth	1957
Laclede Steel Co.	Alton, Ill.	60,000	Enlarge 4 open hearths	July, 1957
Keystone Steel & Wire Co	Peoria, Ill.	20,000	Enlarge 1 open hearth	Mid-1957
Continental Steel Corp.	Kokomo, Ind.	27,580	Improvement of handling equipment	Late 1956
Eastern Stainless Steel Corp	Baltimore	50,000	Add 1 40-ton electric furnace	March, 1957
Southern Electric Steel Co	Birmingham	35,000	Add 1 electric furnace	1957
Jessop Steel Co.	Washington, Pa.	7,000	Electric furnace enlargement, improved technology	Late 1956
TOTAL		14,309,700		

*Being considered

of expansion last March, approximately 1 million tons have been completed. Enough additional projects have been divulged to offset the completions and to raise the current total under way or announced to 14,309,700 tons. Completion dates extend into 1959.

Half of the 14,309,700 tons will be completed next year. Tonnages are scheduled for completion as follows: 1956—483,200 tons; 1957—7,158,500 tons; 1958 — 4,618,000 tons; and 1959 — 1,800,000 tons. One project of 250,000 tons has not been assigned a completion date.

Lost Time—Some projects scheduled for early completion have been delayed by the steelworkers' strike. Construction work was halted at the mills during the strike, and so was production of structural steel for the projects. Structural steel is in strong demand, and, like everybody else, mills are having difficulty getting a sufficient amount soon enough.

The additional steel ingot capacity that has come into operation this year helped steelmaking operations reach a high percentage of capacity quickly after the steelworkers' strike. Although the new capacity is in use, the rate of operations is still computed on the

STEEL INGOT CAPACITY: How It Will Grow, What It Will Cost

	Expected Capacities on Jan. 1 (millions of net tons)	Increase over preceding year (millions of net tons)	Percentage increase over preceding year	Estimated cost (billions)
1957	132.0	3.6	2.8	$1.20*
1958	138.0	6.0	4.5	$1.50
1959	143.0	5.0	3.6	$1.25
1960	148.0	5.0	3.5	$1.25
1961	152.0	4.0	2.7	$1.10
Total		23.6		$6.30

*Includes equipment replacement

How Hot-Rolling Capacities in U. S. Have Changed

Product	Jan. 1, 1956	Jan. 1, 1955	Jan. 1, 1954
Standard rails (over 60 lb per yard)	1,673,000	1,859,000	2,007,000
Rails (60 lb or less per yard)	110,500	112,000	112,000
Long joint or splice bars and tie plate bars	737,580	776,930	812,510
Heavy structural shapes	6,232,224	5,785,412	5,565,270
Rolled steel piling	323,000	247,000	249,400
Sheared plates	7,446,326	7,200,297	7,455,290
Universal plates	1,219,540	1,274,965	1,190,995
Hot-rolled sheets	34,325,512	32,461,865	31,504,045
Coils for cold-reduced black plate and tin plate	6,690,700	6,530,900	6,701,900
Hot-rolled strip	4,564,107	5,067,368	5,177,560
Light bar shapes	719,456	645,754	635,625
Concrete reinforcement bars	2,427,872	2,302,806	1,958,480
All other bars	13,362,333	13,686,942	14,176,150
Wire rods	7,258,007	6,946,757	7,001,375
Skelp	5,636,940	5,707,500	5,630,900
Blanks, tube rounds or pierced billets for seamless tubes	5,090,300	4,996,100	4,945,100
Wheels and axles (rolled)	482,320	476,500	456,700
Blooms and billets for forging	700,660	700,660	700,660
All other finished hot-rolled	286,930	427,686	360,280
Total	99,294,307	97,206,442	96,641,240

basis of Jan. 1, 1956, capacity.

To Add Converters—Two of the projects under way are for installation of the newcomer in steel production—oxygen converters. Jones & Laughlin Steel Corp. will install two converters at its Aliquippa, Pa., plant, and Kaiser Steel Corp. will put two in at Fontana, Calif. The other facility in this country using oxygen converters is McLouth Steel Corp.'s plant at Trenton, Mich. The four new oxygen converters will have a total annual capacity of 914,000 tons.

Twelve additional electric steelmaking furnaces are in the projects under way or announced.

Costly — Expenditures for new equipment and construction in the steel industry are expected to total $1.2 billion this year. STEEL estimates expenditures for additional ingot capacity alone will total that much next year. Estimated expenditures for plant expansions in 1958, 1959 and 1960 are shown in an accompanying table (p. 135).

Handicapping steel producers is the government's policies on depreciation. Steel companies are permitted to lay away without taxation only enough money to cover the original cost of equipment. Today's prices of new facilities far exceed those of only a few years ago.

Contrast—R. L. Gray, new president of Armco Steel Corp., vividly illustrated this predicament. He said the cost of the new hot strip mill (for electrical and stainless sheets) at Armco's Butler, Pa., plant is about $25 million. This mill, though larger and more powerful, replaces a unit built in 1926 for around $2 million.

Benjamin F. Fairless, president, American Iron & Steel Institute, New York, says the nation's steel industry will have to spend $1.1 billion to $1.5 billion in each of the next five years merely to replace facilities that wear out and become obsolete, but that the total it can recover under depreciation provisions of existing tax laws will fall about $3 billion short of doing the job.

Threat—By 1960, the industry-wide cost of replacing plant and equipment will be almost twice as much as can be set aside for wear and exhaustion, unless cost inflation is halted and the depreciation problem is given "good and just" legislative treatment by Congress, Mr. Fairless contends.

Pointing up the magnitude of the depreciation problem, Mr. Fairless says the industry has to replace about 4 per cent of existing steelmaking capacity each year.

A $1.1 billion average annual replacement cost confronting the steel industry during the next five years was computed on the basis that the construction cost index remains at its present level. If the index rises in the future as it has in the last 15 years—at a rate of 7 per cent compounded annually — the replacement outlay would come to $1.5 billion five years from now.

No Panacea—Fast tax write-offs are not a cure-all for the steel industry's depreciation problem, Mr. Fairless asserts. Accelerated amortization has applied only to facilities built under government certification as necessary to national defense. But even this, he says, automatically guarantees something of a future crisis, for when the amortization begins to run out (in 1958-59), the situation becomes worse because depreciation remaining to be taken in the future will be less and will thus aggravate the existing deficiency.

Even alternatives to straight-line depreciation permitted under the Revenue Act of 1954 do "only about half the job that accelerated amortization does and at the time when more of a job is becoming necessary," Mr. Fairless declares.

Ray of Hope—It's possible the Internal Revenue Commissioner may appoint a committee to revise controversial Bulletin F (see STEEL, Sept. 10, p. 106). This document, which gives a schedule of useful lives upon which much of industry must base its tax depreciation rates, is substantially the same as it was when it was last overhauled in 1938. Since then, there has been a revolution in equipment design and in the way machinery is used. Even if the committee is appointed at once, considerable time will pass before revisions can be finalized.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Oxygen in every furnace, high sinter burdens, desulphurization between blast furnace and open hearth—the cake will be the same, but the frosting will be different

Symbol of a trend: Automation and pushbutton operations wherever they can be fitted into steelmaking—but under close human supervision. Pictured is the gaging station on a continuous mill with automatic thickness control

Steelmaking: Portrait of Tomorrow

THE NEW GROWTH is pushing its way slowly through the surface of steelmaking: Things like high sinter burdens, wider use of oxygen, H-iron supplementing scrap, fast desulphurization.

These practices will not revolutionize the industry overnight. Their immediate task will be to squeeze the last percentage of improvement from old, familiar methods.

Ten years from now you will still recognize steelmaking. You'll see the same blast furnaces, same open hearths, same ingots and rolling mills. More of them, of course, and bigger, but looking just about the way they did in '56.

Slowly—What's all the hoopla, then, about the "new" steelmaking ? Precisely this: The steel industry is now so big that big changes must come slowly. Revolutionary methods will take over when and where conventional methods lose their competitive edge. Look at the order books for the current wave of expansion. They tell us there's plenty of life yet in the blast furnace—open hearth—ingot complex.

Although most changes won't be spectacular, you can make a reasonable guess that mills will become more automated, that processes for direct reduction of ore will gain a foothold, that more oxygen converters and continuous casting machines will be in use. There are plenty of hints of things to come.

Ore—The time rapidly approaches when the choice will lie between rich, far-away foreign ores and lean, nearby American and Canadian ores which must be concentrated and agglomerated. The need for producing these agglomerates has led to sudden growth in the number of pelletizing and sintering plants. Many more are coming, both at the mines and at the furnaces where a sintering

plant can make useful raw material of ore fines, coke breeze, mill scale, flue dust and some day, residue from pickle liquor.

The rise of pelletizing and sintering parallels the increase in emphasis on the blast furnace burden. The sinter plant has become the tool through which the size, permeability and content of the charge can be closely controlled.

In the Saddle—Productivity of the blast furnace can probably be increased 20 to 25 per cent by charge preparation. At that rate, other methods of iron production aren't likely to make much headway for awhile. However, these substitutes have been nominated: 1. The low shaft furnace. 2. The rotating horizontal kiln. 3. The blast cupola. 4. Low temperature ore reduction processes employing hydrogen or carbon monoxide. Each has its drawbacks in the present state of development. Two others, the Hoganas process and the Tysland-Hole electric furnace are having limited success.

The low shaft furnace, as operated in Europe with fine ore and coke breeze, creates tremendous dust carry-over. Something would have to be done about that. Enriching the low shaft blast with oxygen has not shown to any great advantage. The furnace might have some use here for producing ferroalloys, but appears to have little other justification while we still have good metallurgical coke.

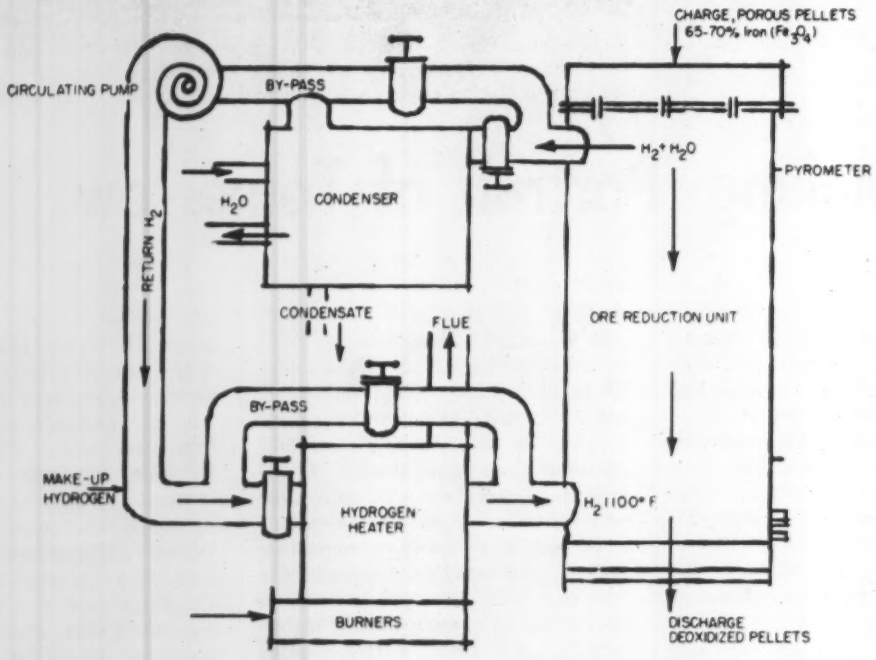
A furnace somewhat resembling a cement kiln has been tried in Europe with low grade ores. It produces cold metal pellets high in impurities such as sulphur. (A similar type is being tested in Birmingham, Ala.)
This may be the forerunner of the "blast furnace lying on its side and rotating," but in its present form, it won't run any blast furnaces out of business.

Scratch Also—The blast cupola stands a chance as a source of hot metal for open hearths in the non-integrated plant. But its charge is 100 per cent scrap, and with scrap at $58 and up, the economic hopes of the blast cupola grow dimmer.

The economic hopes of low temperature reduction processes (H-iron, etc.) are considerably brighter for the same reason (they produce cold metal that can compete with scrap). By the same token, they offer no competition to the blast furnace, but complement it nicely.

Preparation — This brings us squarely back to charge preparation as the means of keeping the blast furnace far out in front. The possibilities range all the way up to the use of a completely self-fluxing sinter. Certainly, much more attention will be paid to sizing of ore, coke and limestone.

Along with eliminating the lumps that reduce too slowly, and the fines that carry over as dust and cut down permeability, the iron content of the charge is likely to be upped. That can cut down coke consumption further (it already has been driven close to ¾-ton of coke to 1 ton of iron), and coke is a sizable factor in the cost of iron.



The McQuaid process for direct reduction of iron ore with hydrogen. Reoxidation of the hot pellets is prevented by raising the hydrogen temperature briefly to 1700°F, then cooling with hydrogen before the charge is released

More Air — Productivity of the furnace will also be raised by packing more air in. Many of the blast furnaces under construction will be equipped for high top pressure to increase the density of the air within the stack (30 U. S. furnaces are already so equipped). Such furnaces need blowers of 20 to 30 per cent greater capacity than those on standard furnaces, one reason why pressure tops are not plentiful on older furnaces.

More companies will introduce oxygen into the blast to speed combustion, and steam to raise the hydrogen level. With iron-rich charges, some furnaces may be operated with blast temperatures of 1500°F instead of 900 to 1200°F. The effect on refractories could well speed the progress of carbon up the stack and the higher heat will be reflected in changes in stove design.

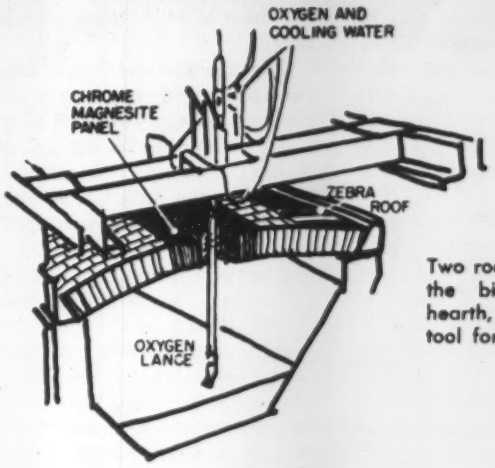
Sulphur—Another effect of the iron-rich charge will be to bring slag volume below the point where it will desulphurize the iron sufficiently (and at a time when low-sulphur coal is becoming increasingly scarce). Rather than cut down the productivity of the furnace by adding gangue materials, the tendency will be to let the sulphur go up, and bring it down later in a separate step.

Thus the great interest in methods of desulphurization between blast furnace and open hearth. Lime, caustic soda, calcium carbide and calcium cyanamide all show ability as desulphurizers in the ladle or Thomas converter. Chances are that any method that becomes standard will fit into one of the existing steps between the blast furnace and open hearth, such as ladle, bottle car or mixer. It will have to be cheap and fast and bring the sulphur down to 0.01 per cent.

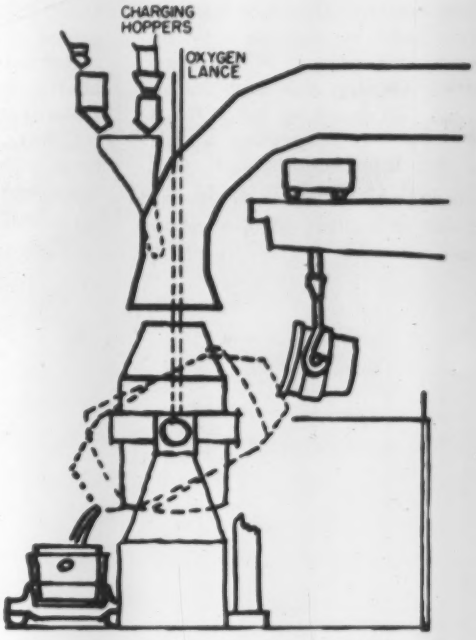
One method under development, along with bringing down the sulphur, will bring down the silicon to 0.05 per cent and raise the iron temperature to 3000°F. Low-sulphur, low-silicon steel, charged in the open hearth at this temperature, could cut 3 hours off open hearth time. In the electric furnace, it might save 40 per cent in electric power.

Scrap — Soaring scrap prices (rather than any deficiency of the blast furnace) may soon instigate construction of direct, low-temperature ore reducing plants. One of the H-iron processes (several have been proposed) can manufacture a product for $40 to $50 a ton that can substitute for steel scrap.

With scrap pushing $60 a ton, the risks in H-iron look highly attractive. If scrap prices don't break soon, the first H-iron plant may be built to drive scrap back to a reasonable price. Since these processes require a large supply of cheap hydrogen or carbon monoxide, a logical place for the first one would be a plant near a large oil refinery.



Two roads for oxygen: In the big, shallow open hearth, oxygen becomes a tool for greater efficiency



In the top-blown converter it creates a new process. Cheap oxygen has added a new dimension to steelmaking

Oxygen—This gas fits in the picture because of its rising stature as both raw material for steelmaking and utility of a hundred uses in scarfing, cutting and welding. No steel plant today is complete without its own oxygen plant or tank distribution center. The number of steel mill oxygen plants is bound to increase.

Spectacular uses of oxygen are

the top blown converters at McLouth Steel Corp., Detroit. Others will soon be making steel at Jones & Laughlin, Aliquippa, Pa., and Kaiser Steel Co., Fontana, Calif. By 1957, oxygen converter capacity in the U. S. and Canada will reach 2.5 million tons, and should keep on growing.

Fed with hot pig and home-generated scrap, the converters give these mills nice flexibility for turning out quality steel directly, or duplexing in electric furnace or open hearth. They will desiliconize and desulphurize the charge with satisfactory control. One of their important selling points is the low-nitrogen metal they produce.

Open Hearth—How fast the converters move in, depends a lot on success with oxygen in the open hearth. Oxygen has been added through the doors by lance for a long time. It is getting a fair trial by injection through roof ports, and at the burners to enrich the combustion flame. It can cut heat-to-heat times almost in half.

Another method being tried to cut the length of heats combines heating and melting with charging —continuous charging in effect. Every hour of charging time saved can cut $2 a ton off the cost of steelmaking. Another approach being tried is to charge with bigger boxes, or dump buckets, which mean bigger doors for the furnace.

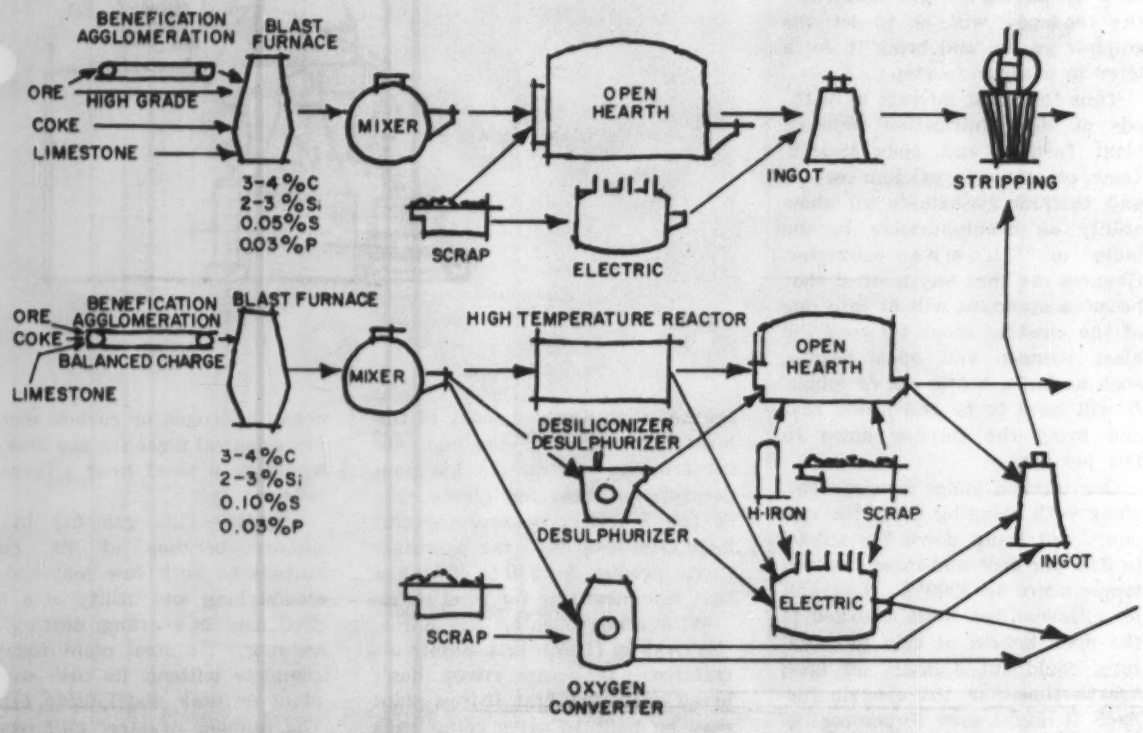
The added heat from oxygen puts a new burden on the roof refractories; the extra dust creates more problems for the checkers. Success in using the open hearth as a shallow pan-type oxygen converter is going to depend a lot on how those problems are solved.

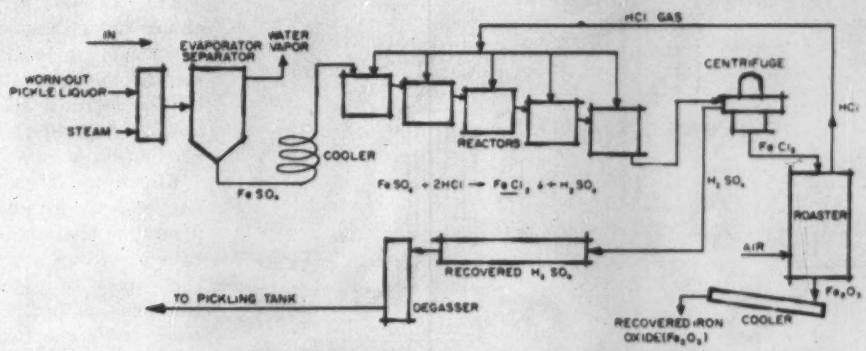
Refractories—The all-basic open hearth roof is due for further gains because of its ability to withstand higher heat than silica roofs. The zebra roof, alternating silica and basic brick, has shown up well in some oxygen-through-the-roof trials, and will probably get a bigger play.

Problems of scouring at the slag line in the oxygen converter seem to be well enough under control, so that refractories won't hold up the growth of that vessel.

In spite of higher costs, more open hearth checkers may go basic. It is claimed that they stay cleaner and conserve fuel in consequence.

By-Products — Certainly, the next ten years are going to see cleaner mills. The law, conscience and economics are hard at work pushing measures for fume and dust control, so that more bag houses and precipitators are going to be features of the steel mill scene. They'll be joined by more clarifiers and other installations for cleaning up mill water. Because mill wastes are so rich in iron, fuel and other minerals, the emphasis will swing from waste disposal to by-product recovery.

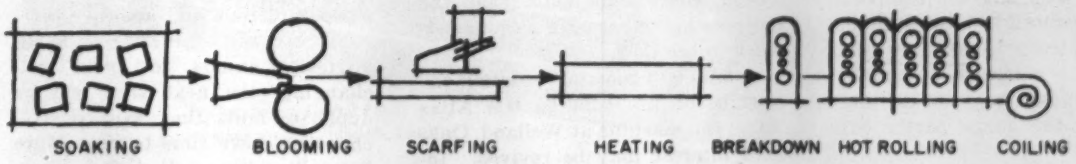




The Ruthner process for pickle liquor and iron oxide recovery. The time is ripe for it (or some other process) to control a great nuisance

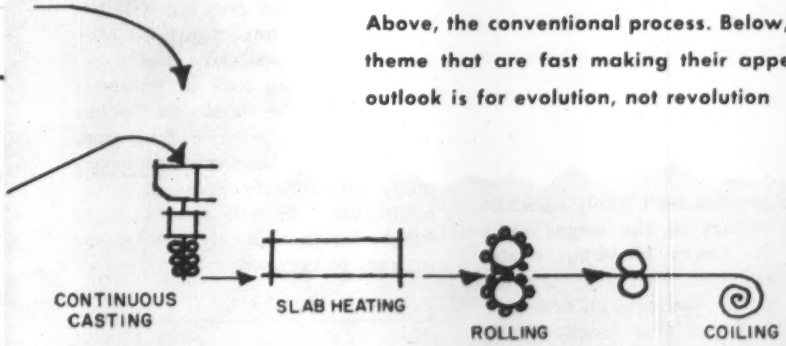
The sintering plant is a big factor here. So are coke by-product recovery units which are being forced into oil refinery techniques to compete with petroleum-base benzene, toluene and xylene. The pilot installations for pickle liquor recovery are likely to result in full scale installations soon that will cut pickling waste, and eliminate the problem of disposing of worn-out baths.

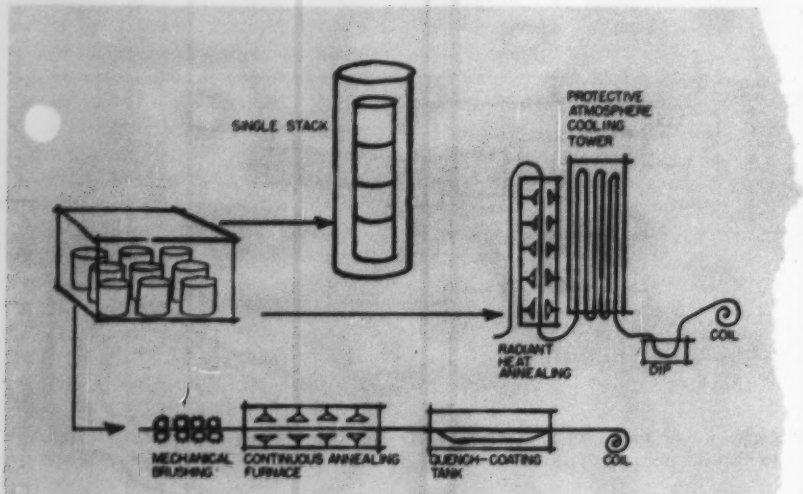
Electrics—STEEL has predicted that 14 per cent of our steel capacity will be melted in electric



New Directions for Steelmaking

Above, the conventional process. Below, variations on the same theme that are fast making their appearance. The immediate outlook is for evolution, not revolution





Single stack furnaces and fast continuous processes are broadening the annealing picture

furnaces within 15 years (the percentage stands now at 8.5). The new furnaces (25 per cent of new capacity) are likely to be bigger. Many of them will be used for melting carbon steel, especially in nonintegrated mills.

The 100 per cent scrap charge will give way to one composed partly of reduced iron ore briquets (H-iron) if the price of scrap stays up where all signs say it will. Integrated mills may find it more economical to charge partly with hot metal.

Revival of an old idea could see electrics used primarily for melting, with rapid refining carried out in a rotating mixer that intimately blends slag and steel for fast deoxidation.

Vacuum — The specialty steel producers will continue to cut a swath with vacuum melting, but the bulk of steelmaking will be scarcely affected. The cost has to come down first, and that means a move away from small batch melting and small ingots.

The shift could come in the direction of the consumable electrode, or electric ingot processes. Ladle degassing, or degassing the pouring stream as in the Bochumer Verein process, may find economical uses in fields other than the manufacture of forging ingots. The idea of clean gas-free metal is attractive enough to keep interest in vacuum steel high for a long time.

Setback—It doesn't look as if continuous casting is going to seriously contest the position of the ingot for a while. With Inland Steel Co., Chicago, pulling in its horns, there's no doubt that the process has received a serious setback in the U. S.

Inland will soon be reporting the results of its tests on the Atlas Steel Co. machine at Welland, Ont., and interest may be revived. Inland insists the tests were encouraging, but there wasn't time in its expansion timetable to master the complexities of a unit big enough to integrate with its other facilities.

Outlook—Meanwhile, Atlas continues to resolve the difficulties of the process. Ten installations in foreign countries will be operating soon. Braeburn Alloy Steel Corp., Braeburn, Pa., has had a continuous caster operating for about a year.

The process isn't likely to make much impact in the larger mills until the heavy blooming equipment has been pushed to its practical limits. The next all-new steel plant built in this country may well adopt continuous casting, but expansion plans already announced move such a mill back to at least 1960 and probably later.

The Hazelett strip casting machine (which has been around a long time) is still in the experimental class for steel. Its future in the ferrous field is anybody's guess. Any effect it may have on production is years ahead.

Finishing—That leaves the ingot, soaking pit and blooming mill firmly in the saddle as steps between refining and finishing. Like the rest of steelmaking, the changes coming in finishing are more of degree than kind.

Rolling, for instance, will continue to get faster and more automated. The operator will stand by to make minor adjustments on automatic screw down and cycling controls. Greater speeds will require constant velocity spindle couplings, greater billet and slab heating capacity (possibly induction heating). Quicker automatic shutdowns will minimize the loss from cobbles. Sensing devices may be coming to spot weakness before cobbles occur.

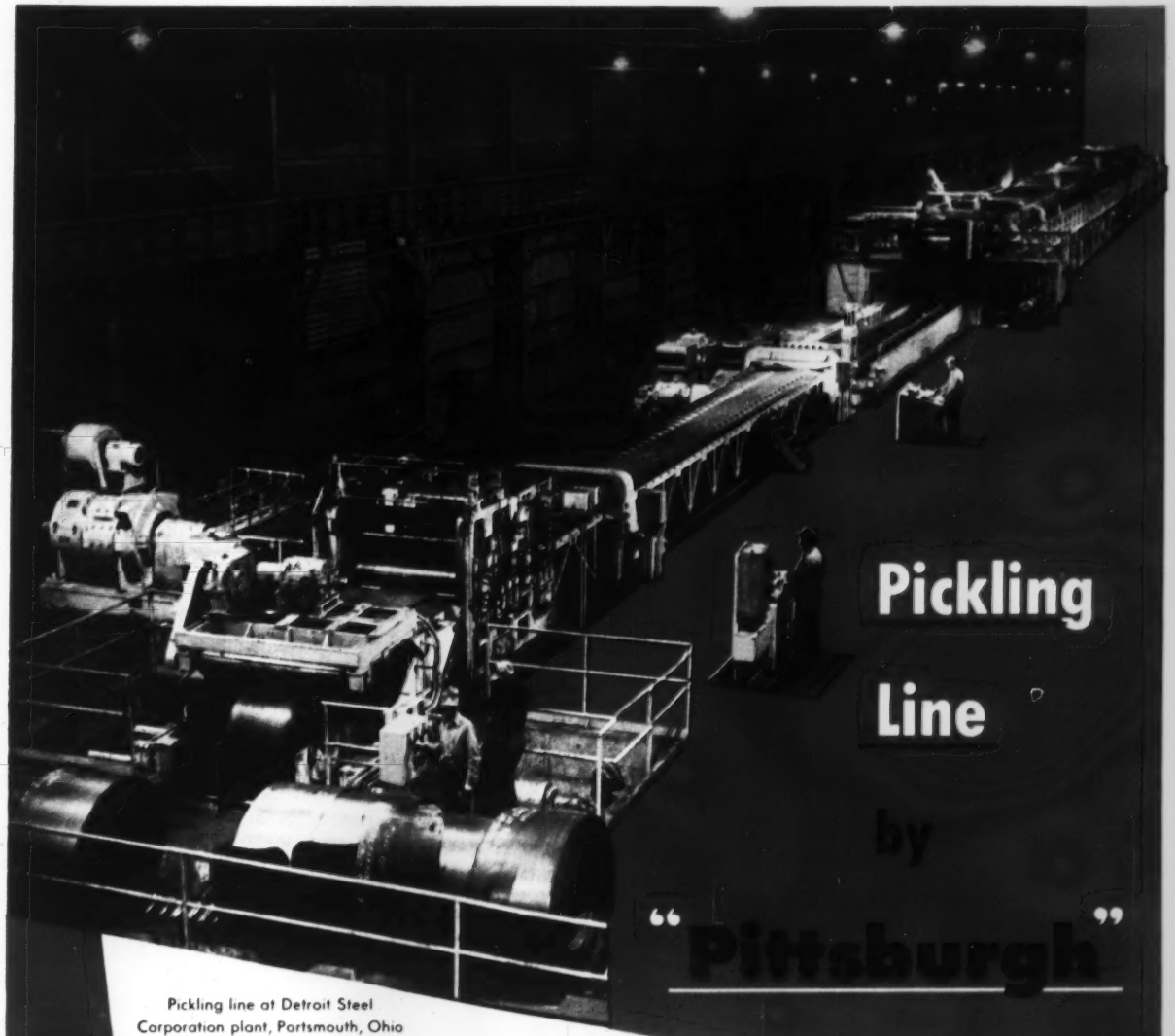
Power—The shift to individually powered stands will continue. There's plenty of life yet in the motor generator set, but rectifiers will keep on gaining favor as electronic maintenance men become more numerous and adept.

From current practice of using duplicate stands to speed roll changing, the next step will be duplicate mills that will cut roll changing down time to zero. More hot rolling lines will shift to abrasive blast cleaning, even if methods for recovering pickle liquor work out.

More Shifts—Coil annealing will tend more and more to single stack or continuous furnaces. Extrusion followed by cold drawing will become of major importance for production of shapes and tubes.

Any way you look at it, steelmaking in the next ten years stacks up to a picture of bigness, of refinements in details, of maximum productivity from familiar equipment. It will take a little longer for the radical "new" steelmaking to take over.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



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Pickling line at Detroit Steel Corporation plant, Portsmouth, Ohio

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TUESDAY, SEPT. 25, 9:30 A.M.
ELECTRICAL SESSION (Ballroom)

Chairmen: Ray T. Winterringer, assistant superintendent, Electrical Department, South Chicago Works, Republic Steel Corp., Chicago; Richard G. Nolan, electrical engineer, Granite City Steel Co., Granite City, Ill.

Electrical Equipment for Continuous Annealing of Silicon Steel Strip—G. J. Hay, steel mill engineer, Westinghouse Electric Corp., East Pittsburgh, Pa., and Hugh S. Fegely, control design engineer, Westinghouse, Buffalo.

Application of Speed Controls for Hot Strip Finishing Mills—George S. Koss, superintendent, plate, slab and strip mill, and Louis E. Ringger, general supervisor, electrical engineering, Columbia-Geneva Steel Division, United States Steel Corp., Provo, Utah.

Electrical Features of a Hot Strip Mill Reversing Rougher with Close Coupled Edger—J. H. Greiner, application engineer, Electrical Application Department, and A. Mozina, engineer, control section, Allis-Chalmers Mfg. Co., Milwaukee.

TUESDAY, SEPT. 25, 9:30 A.M.
BLAST FURNACE SESSION (Clubroom B)

Chairmen: J. H. Strassburger, assistant vice president, National Steel Corp., Pittsburgh; George H. Greene, assistant general manager, Bethlehem Steel Co., Johnstown, Pa.

Reducing Delays During the Blast Furnace Campaign Through Improvement of Mechanical Features—W. O. Bishop, superintendent, and Charles P. Frame, mechanical foreman, Plant 2 Blast Furnaces, Inland Steel Co., East Chicago, Ind.

Automatic Split-Wind Blowing Equipment—Duquesne Works—James S. Frazer Jr., general supervisor, power and fuel, Engineering Department, Duquesne Works, United States Steel Corp., Duquesne, Pa.

Development of Tuyere Air Proportioning for the Blast Furnace—E. K. Miller Jr., assistant division superintendent, blast furnaces, Gary Steel Works, United States Steel Corp., Gary, Ind.

TUESDAY, SEPT. 25, 2:00 P.M.
MECHANICAL SESSION (Clubroom B)

Chairmen: C. W. Bruce, chief engineer, Chicago district, Republic Steel Corp., Chicago; Charles H. Good Jr., chief engineer, Duquesne Works, U. S. Steel, Duquesne, Pa.

The Design of Mill Buildings—J. J. Murray, development engineer, Jones & Laughlin Steel Corp., Pittsburgh, and Thomas C. Graham, chief design draftsman, Design Engineering Department, Pittsburgh Works, Jones & Laughlin Steel Corp., Pittsburgh.

Treatment and Re-Use of Mill Scale Wastes to Conserve Water and Abate Pollution—Grant A. Pettit, industrial waste control engineer, Armco Steel Corp., Middletown, O.

Economics of Oxygen Generating Stations for Steel Mill High and Low Purity Oxygen Applications—Arthur E. Steele, manager, and Donald E. Cummings, assistant manager, Steel Mill Sales Division, Air Products Inc., Allentown, Pa.

TUESDAY, SEPT. 25, 2:00 P.M.
COMBUSTION SESSION (Ballroom)

Chairmen: R. A. Lambert, superintendent, steam & combustion, Jones & Laughlin Steel Corp., Pittsburgh; David Cousley, assistant superintendent, utilities, Wheeling Steel Corp., Steubenville, O.

The Relative Value of Various Gases for Scarfing—W. M. Bloom, combustion engineer, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

The Prevention of Gas Incidents—T. A. Watson, assistant division superintendent, power production, United States Steel Corp., South Works, Chicago.

Control of Atmosphere Generators—R. R. Swain, manager, Iron & Steel Division, Bailey Meter Co., Cleveland.

WEDNESDAY, SEPT. 26, 9:00 A.M.
ELECTRICAL SESSION (Ballroom)

Chairmen: F. H. Wickline, electrical engineer, United States Steel Corp., National Tube Division, Pittsburgh; Ernest F. Donatic, assistant general superintendent, Service Division, Kaiser Steel Co., Fontana, Calif.

Greater Flexibility for Wire Drawing—R. C. Suttle, application engineer, Reliance Electric & Engineering Co., Cleveland, and Maurice A. Nye, chief engineer, Vaughn Machinery Co., Cuyahoga Falls, O.

Electrical Maintenance at the Pueblo Plant of the Colorado Fuel & Iron Corp.—H. E. Watson, electrical superintendent, Colorado Fuel & Iron Corp., Pueblo, Colo.

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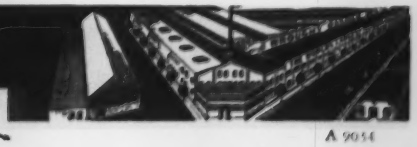

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Protection of Men Exposed to the Hazards of Moving Overhead Electric Cranes—Harold R. Miller, general foreman assigned maintenance, Butler Works, Armco Steel Corp., Butler, Pa.

WEDNESDAY, SEPT. 26, 9:00 A.M.
COMBUSTION SESSION (Clubroom B)

Chairmen: Frank C. McGough, superintendent, power & fuel, Detroit Steel Corp., Portsmouth Works, Portsmouth, O.; H. B. Helm, fuel engineer, Youngstown Sheet & Tube Co., East Chicago, Ind.

Normalizing and Heat Treating of Steel Plate—Horace Drever, president, and N. K. Willis, chief engineer, Drever Co., Bethayres, Pa.

Study of Factors Influencing Surface Staining of Cold Rolled Steel: Part I—Types of Defects and Their Occurrence—C. R. Lillie, research metallurgist, and D. W. Levinson, supervisor, nonferrous metals research, Armour Research Foundation, Illinois Institute of Technology, Chicago; and Part II—Identification and Reaction Mechanisms—F. Schossberger, senior scientist, K. Hattori, research chemist, and H. Marver, assistant chemist, Armour Research Foundation, Illinois Institute of Technology, Chicago.

Modernization of Wheel Heating Facilities, Johnstown Plant, Bethlehem Steel Co.—F. R. Pullen, fuel engineer, Bethlehem Steel Co., Johnstown, Pa.

WEDNESDAY, SEPT. 26, 2:00 P.M.
OPERATING PRACTICE SESSION (Ballroom)

Chairmen: Karl L. Fetters, assistant vice president-charge operations, Youngstown Sheet & Tube Co., Youngstown; S. O. Evans, manager, tubing operations, Babcock & Wilcox Co., Tubular Products Division, Beaver Falls, Pa.

Nuclear Technology and the Steel Industry—R. P. Peterson, director, nuclear research, Republic Steel Corp., Cleveland.

Transportation Control in Steelmaking—J. L. Kerins, general transportation manager, Steel Operating Division, United States Steel Corp., Pittsburgh.

Pipe: Manufacture and Use—P. D. Thomas, materials engineer, Asiatic Petroleum Corp., New York.

WEDNESDAY, SEPT. 26, 2:00 P.M.
LUBRICATION AND PAINT SESSION (Clubroom B)

Chairmen: Donald E. Whitehead, general lubrication engineer, Crucible Steel Co. of America, Pittsburgh; Charles T. Lewis, chief lubrication engineer, Republic Steel Corp., Cleveland.

Solvent Degreasing—A Valuable Industrial Cleaning Process—W. L. McCracken, director of research, Detrex Corp., Detroit.

Evaluation and Specification of Paint for Industrial Use—Joseph Bigos, senior fellow, Mellon Institute, and director of research, Steel Structures Painting Council, Pittsburgh.

Silicone Lubricants and Protective Coatings in the Steel Industry: Part I—Silicone Lubricants—W. H. Ragborg, laboratory supervisor, and W. H. Badger, development engineer, fluids section, Product Development Laboratories, Dow Corning Corp., Midland, Mich.; and Part II—Silicone Protective Coatings—R. C. Hedlund, supervisor, coatings laboratory, Product Development Laboratories, Dow Corning Corp., Midland, Mich.

THURSDAY, SEPT. 27, 9:00 A.M.
OPERATING PRACTICE SESSION (Ballroom)

Chairmen: George F. Bottcher, chief engineer, Allegheny Ludlum Steel Corp., Brackenridge, Pa.; Warren E. Hart, superintendent, electric furnace building, Ford Motor Co., Rouge Plant, Dearborn, Mich.

Experimental Results with Hollow Electrodes in Electric Steel Furnaces—W. E. Schwabe, product and process development laboratory, National Carbon Co., Niagara Falls, N. Y.

Economic Future of the Large Top Charge Electric Furnace—William B. Wallis, president, Lectromelt Furnace Co., a McGraw Electric Co. division, Pittsburgh.

Basic Hot Blast Cupola as Source of Hot Metal for Steel Plants—E. S. Harman, president, E. S. Harman Corp., Chicago, and Siegfred Tunder, technical director, Gesellschaft fur Huttenwerksanlagen, Dusseldorf, Germany.

THURSDAY, SEPT. 27, 9:00 A.M.
LUBRICATION SESSION (Clubroom B)

Chairmen: C. A. Bailey, lubrication engineer, United States Steel Co., National Tube Division, Pittsburgh; Andrew Cichelli, lubrication engineer, Bethlehem Steel Corp., Construction & Engineering Department, Bethlehem, Pa.

Measurements for the Consistency of Lubricating Greases—Ben Holliday, chemist, Materials Engineering Division, Crucible Steel Co., Midland, Pa.

High Temperature Steel-Mill Greases—John Simon, lubrication engineer, National Works, National Tube Division, United States Steel Corp., McKeesport, Pa.

Stopping Corrosion by the Use of Rust Preventive Compounds—R. P. Mills, manager, Rust Preventive Division, Valvoline Oil Co., Freedom, Pa., division of Ashland Oil & Refining Co.

FRIDAY, SEPT. 28, 9:00 A.M.
ROLLING MILL SESSION (Ballroom)

Chairmen: C. S. Lambert, superintendent, Merchant Mills, Campbell Works, Youngstown Sheet & Tube Co., Youngstown; Don C. Horsman, plant superintendent, Continental Steel Corp., Kokomo, Ind.

Seamless Tube Making by the Calmes Process—Dr. Albert Calmes, Albert Calmes & Co., Milan, Italy, and Clyde Roberts, chief engineer, Phoenix Iron & Steel Co., Phoenixville, Pa.

Backup Rolls and Their Contribution to Gage Variation—Earl G. Lindsey, general foreman-roll shop, Cold Reduction Department, Sheet & Tin Mill, Columbia-Geneva Steel Division, United States Steel Corp., Pittsburg, Calif.

Weirton Modernizes Its Hot Mill—L. A. Fugassi, assistant chief engineer, Weirton Steel Co., Weirton, W. Va.

FRIDAY, SEPT. 28, 9:00 A.M.
COMBUSTION SESSION (Clubroom B)

Chairmen: F. Bruce Bevelheimer, power & fuel engineer, Ford Motor Co., Steel Division, Rouge Plant, Dearborn, Mich.; George H. Krapf, division superintendent, Power Production, United States Steel Corp., South Works, Chicago.

An Automatic System of Fuel Control—D. R. Mathews, open hearth superintendent, Alan Wood Steel Co., Conshohocken, Pa.

Modifications to the Fontana Open-Hearth Precipitators—E. V. Akerlow, assistant division manager, Kaiser Engineers, Steel Division, Oakland, Calif.

The All-Basic Open Hearth Furnace—R. P. Heuer, vice president, and M. A. Fay, assistant general sales manager, General Refractories Co., Philadelphia.

FRIDAY, SEPT. 28, 9:00 A.M.
ELECTRICAL SESSION (Ballroom)

Chairmen: Robert T. Lucas, electrical superintendent, Weirton Steel Co., Weirton, W. Va.; Clayton L. Squier, assistant superintendent, Electrical Department, Bethlehem Steel Corp., Lackawanna, N. Y.

Roughing Motor Inching Drives—Dr. Roger Shields, Development Engineering Department, Elliott Co., Jeannette, Pa., and H. Kermit Fish, assistant electrical superintendent, Weirton Steel Co., Weirton, W. Va.

Automatic Gage Control for Cold Reduction Mills—R. A. Phillips, analytical engineering section, and H. S. Maxwell, steel mills systems application engineering section, General Electric Co., Schenectady, N. Y.

Automatic Gage Control and Production Analysis on a 'Z' Mill—J. W. Hopper Jr., gage application engineer, Pratt & Whitney Co., West Hartford, Conn.

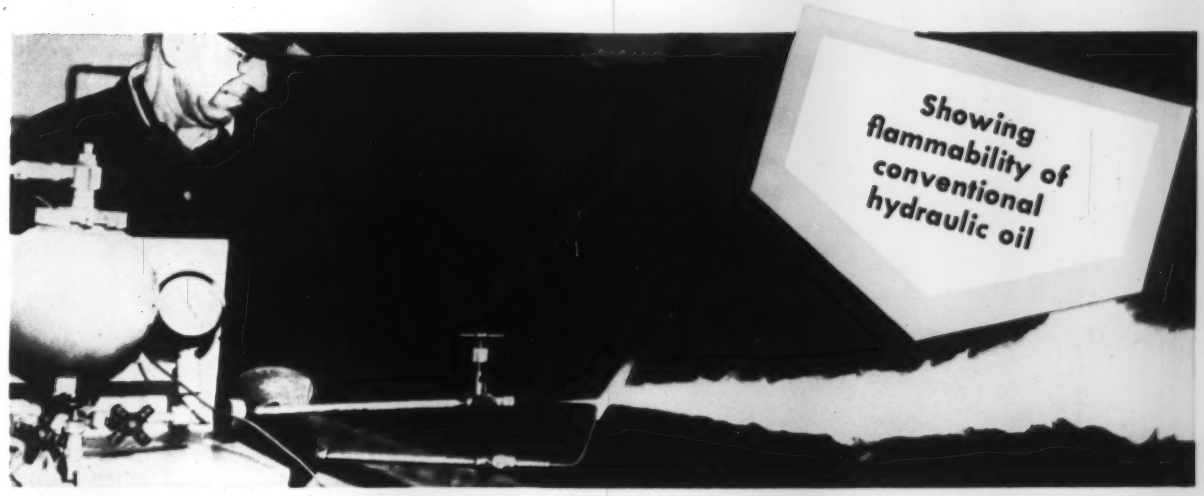
FRIDAY, SEPT. 28, 2:00 P.M.
OPERATING PRACTICE SESSION (Clubroom B)

Chairmen: H. R. Knust, assistant to general manager, Bethlehem Steel Co., Sparrows Point, Md.; H. A. Long, chief engineer, Pittsburgh Steel Co., Monessen, Pa.

Basic Data on Mechanical Cleaning Operations in Steel Plants—Gilbert D. Dill, engineer in charge of steel division, Wheelabrator Corp., Mishawaka, Ind.

Automation and Its Tooling and the Concept Used at Inland Steel Co.'s New Rail Joint Line—C. E. Chapman, superintendent, Rail Accessories Department, Inland Steel Co., Indiana Harbor Works, East Chicago, Ind.

Edge Position Control for the Steel Strip Industry—Frank J. Markey, manager, Edge Position Controls Division, Askania Regulator Co., Chicago.



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Entirely new formula: Shell Irus Fluid 902 is a special formulation . . . product of three years' development and field testing. It is suitable for nearly all industrial hydraulic systems, as a direct replacement for presently used oils. *Here is a fire-resistant hydraulic fluid that can be widely used.*

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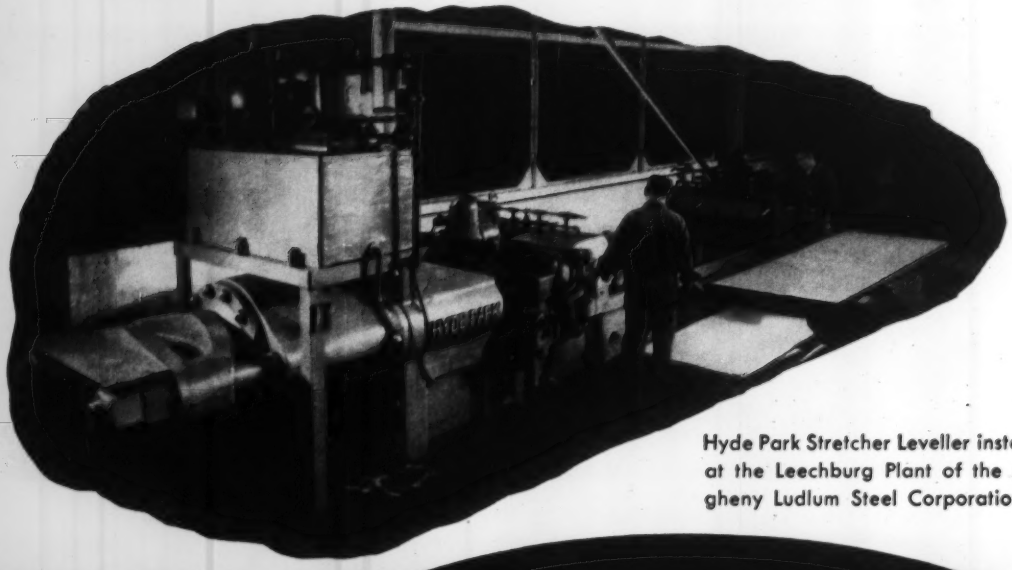
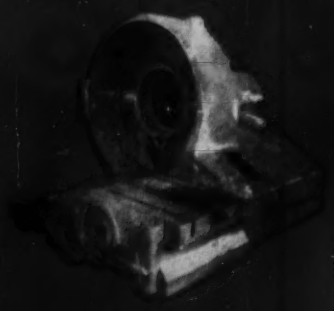
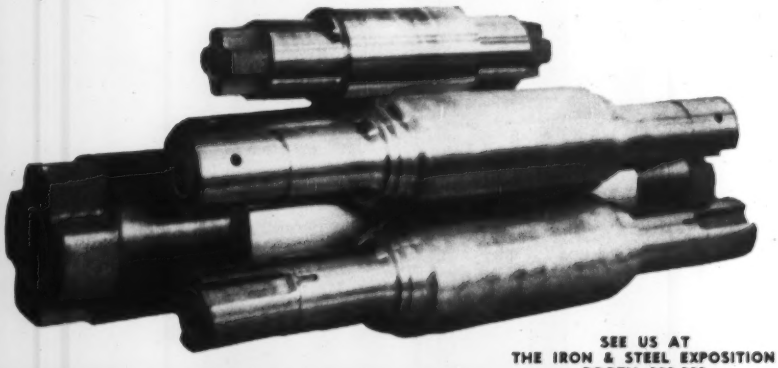


Hyde Park Stretcher Leveller installed at the Leechburg Plant of the Allegheny Ludlum Steel Corporation.

Hyde Park ROLLS and ROLLING MILL EQUIPMENT



In this period of increasing competition when high production costs can so easily disrupt sales, Hyde Park Rolls and Hyde Park Rolling Mill Equipment take on a new order of importance; for Hyde Park means efficiency. Yes, smoother operation, less maintenance cost, more economical production.



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BOOTH 300-301

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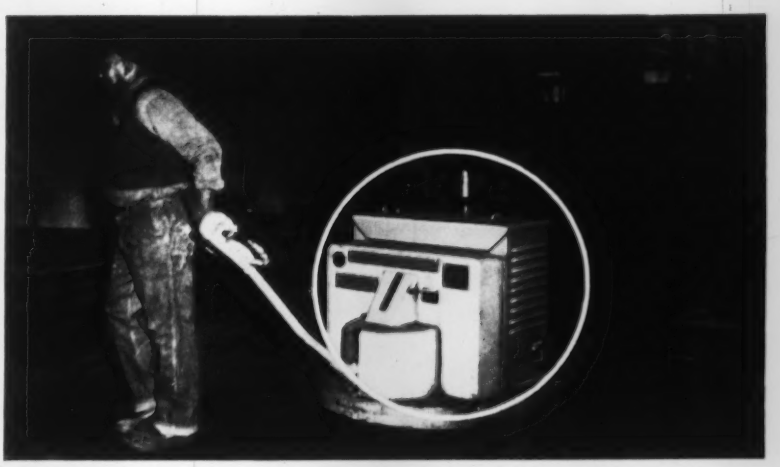
HYDE PARK, WESTMORELAND COUNTY, PITTSBURGH DISTRICT, PA.

EXHIBITORS

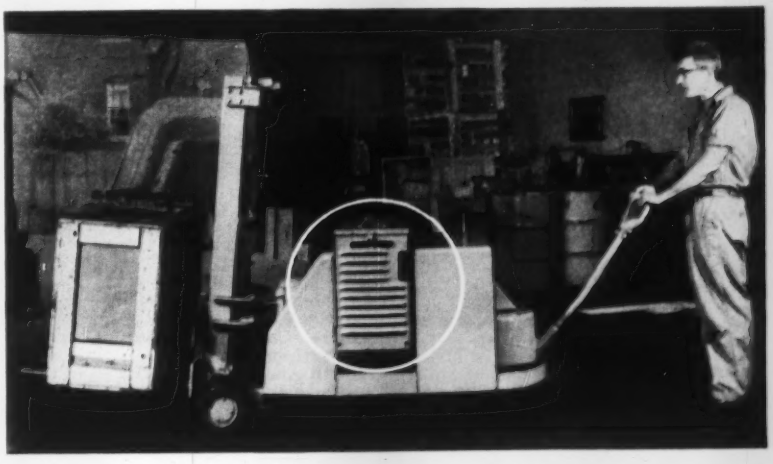
Exhibit hours will be 10 a.m. to 10 p.m. on Sept. 25-26; 10 a.m. to 5 p.m. on Sept. 27; and 10 a.m. to 4 p.m. on Sept. 28. The 177 exhibitors have contracted for 431 booths, assuring show visitors a comprehensive sampling of the latest in steel plant equipment and processes.

Exhibitors	Booth No.
Acetogen Gas Co., Detroit	16
Adalet Mfg. Co., Cleveland	87
Air Reduction Sales Co., New York	423
Ajax Flexible Coupling Co. Inc., Westfield, N. Y.	101
Alemite Division, Stewart Warner Corp., Chicago	126
Allen-Bradley Co., Milwaukee	104
Alliance Machine Co., Alliance O.	232
Louis Allis Co., Milwaukee	113
Allis-Chalmers Mfg. Co., Milwaukee	34
American Air Filter Co. Inc., Louisville	342
American Brake Shoe Co., New York	264
American Ferrox Corp., New York	520
Ampco Metal Inc., Milwaukee	44
Anaconda Wire & Cable Co., New York	407
Appleton Electric Co., Chicago	292
Askania Regulator Co., Chicago	240
Automatic Transportation Co., Chicago	68
Automation, Cleveland	425
Bailey Meter Co., Cleveland	250
Bearing Service Co., Pittsburgh	320
Arnold O. Beckman Inc., South Pasadena, Calif.	521
Blaw-Knox Co., Pittsburgh	98
E. W. Bliss Co., Canton, O.	72
Bloom Engineering Co. Inc., Pittsburgh	84
Brown Fintube Co., Elyria, O.	546
C & D Batteries Inc., Conshohocken, Pa.	442
Chromium Corp. of America, Chicago	80
Cities Service Petroleum Inc., New York	31
Clark Controller Co., Cleveland	89
Cleveland Engineering Society, Cleveland	519
Cleveland Worm & Gear Co., Farval Corp., Cleveland	275
Cone-Drive Gears, division of Michigan Tool Co., Detroit	332
Cooper Split Roller Bearing Corp., Pittsburgh	214
Crouse-Hinds Co., Syracuse, N. Y.	340
M. E. Cunningham Co., Pittsburgh	116



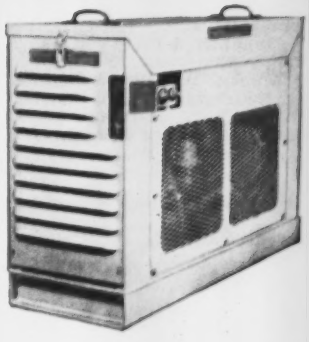
The Most Versatile Power Unit Ever Developed For Small Trucks

READY-POWER BANTAM MODEL W



Only the compact new Bantam Model W provides smooth, dependable gas-electric power that can be quickly interchanged from truck to truck.

A new high-performance unit features 12-volt automotive-type starting and ignition system plus complete choice of idling speed. Full access to engine and generator simplifies adjustment, even on the truck. Fits practically all makes of walkie and rider trucks up to 2000 lbs. *Write today for full information.*



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Manufacturers of Gas and Diesel Engine Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

Exhibitors	Booth No.
Cuno Engineering Corp., Meriden, Conn.	453
Curry Air Shear Corp., Pittsburgh	20
Cutler-Hammer Inc., Milwaukee	59
Delpark Corp. and Industrial Filtration Co., Lebanon, Ind.	427
M. H. Detrick Co., Chicago	527
Dravo Corp., Pittsburgh	209
Electric Controller & Mfg. Co., division, Square D Co., Cleveland	27
Electric Furnace Co., Salem, O.	1
Electric Products Co., Cleveland	91
Electric Storage Battery Co., Exide Industrial Division, Philadelphia	144
Elliott Co., Jeannette, Pa.	294
Elwell-Parker Electric Co., Cleveland	484
Enterprise Co., Columbiana, O.	308
Euclid Electric & Mfg. Co., Madison, O.	107
Fabreeka Products Co., Boston	517
Federal Pacific Electric Co., Cleveland	474
Femco Inc., Irwin, Pa.	128
Foote Bros. Gear & Machine Corp., Chicago	523
Foundry, Cleveland	425
Foxboro Co., Foxboro, Mass.	62
Gear Grinding Machine Co., Detroit	525
General Electric Co., Apparatus Sales Division, Schenectady, N. Y.	278, 310
General Electric Co., Distribution Assemblies Department, Plainville, Conn.	285
General Electric Co., Circuit Protective Devices Department, Plainville, Conn.	284
Gleason Reel Corp., Milwaukee	226
Gould-National Batteries Inc., Industrial Division, Trenton, N. J.	363
Gulf Oil Corp., Pittsburgh	96
Hagan Corp., Pittsburgh	3
Harnischfeger Corp., Milwaukee	64
Heil Process Equipment Corp., Cleveland	138
Heyl & Patterson Inc., Pittsburgh	242
Holophane Co. Inc., New York	7
Homestead Valve Mfg. Co., Coraopolis, Pa.	330
E. F. Houghton & Co., Philadelphia	22
C. B. Hunt & Son Inc., Salem, O.	5
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.	286
Hyde Park Foundry & Machine Co., Hyde Park, Pa.	300
Ideal Industries Inc., Sycamore, Ill.	88
Industrial Gear Mfg. Co., Chicago	405
Industrial Heating, Pittsburgh	
Industrial Nucleonics Corp., Columbus	461
Iron Age, Philadelphia	475
Iron Lung Ventilator Co., Cleveland	498
Island Creek Coal Sales Co., Huntington, W. Va.	532
I-T-E Circuit Breaker Co., Cleveland	252
Johns-Manville Sales Corp., New York	273
Joy Mfg. Co., Pittsburgh	81
Kay Lab, San Diego, Calif.	531
S. P. Kinney Engineers Inc., Carnegie, Pa.	355
Koppers Co. Inc., Pittsburgh	248, 268
Lake Shore Electric Corp., Bedford, O.	460
Larco Inc., Painesville, O.	93
Leeds & Northrup Co., Philadelphia	75
Leslie Co., Lyndhurst, N. J.	477
Link-Belt Co., Chicago	122
Loftus Engineering Corp., Pittsburgh	495
Machine Design, Cleveland	425
Magnaflux Corp., Chicago	529
Manco Mfg. Co., Bradley, Ill.	478
Manning, Maxwell & Moore Inc., Shaw-Box Crane & Hoist Division, Muskegon, Mich.	263
Mansaver Industries Inc., New Haven, Conn.	497
Markal Co. & Lake Chemical Co., Chicago	140
Mars Engineering & Fabricating Co., Mars, Pa.	409
Martindale Electric Co., Cleveland	121
Master Builders Co., Cleveland	508
Jas. H. Matthews & Co., Pittsburgh	18
McDowell Co. Inc., Cleveland	216, 223
Mesta Machine Co., Pittsburgh	288, 304
Metal Progress, Cleveland	53
Mine Safety Appliances Co., Pittsburgh	400
Minneapolis-Honeywell Regulator Co., Industrial Division, Philadelphia	259
Modern Sound Co.	468
Morgan Construction Co., Worcester, Mass.	344
Morgan Engineering Co., Alliance, O.	221
Motor Generator Corp., Troy, O.	441
National Electric Coil Co., Columbus, O.	322
New Equipment Digest, Cleveland	425
Nickel Cadmium Battery Corp., Easthampton, Mass.	142
North American Mfg. Co., Cleveland	130
Ohio Carbon Co., Cleveland	324
Ohio Electric Mfg. Co., Maple Heights, O.	66
Okonite Co., Passaic, N. J.	317
Omark Industries, Portland, Oreg.	542
Osborn Mfg. Co., Cleveland	469
Pangborn Corp., Hagerstown, Md.	8
Pannier Corp., Pittsburgh	325
Parker Appliance Co., Tube & Hose Fitting Division, Cleveland	541
Penton Publishing Co., Cleveland	425
Poole Foundry & Machine Co., Baltimore, Md.	352
H. K. Porter Company Inc., Delta-Star Electric Division, Chicago	465
H. K. Porter Company Inc., Electric Service Works, Delta-Star Electric Division, Philadelphia	463
H. K. Porter Company Inc., Laclede-Christy Co. Division, St. Louis	510
Portomag Inc., Ferndale, Mich.	450
Post-Glover Electric Co., Cincinnati	227
Pratt & Whitney Co. Inc., West Hartford, Conn.	306
Pyle-National Co., Chicago	143
Radiant Lamp Corp., Newark, N. J.	445
Ramtite Co., Chicago	328
Ready-Power Co., Detroit	14
Red Seal Electric Co., Cleveland	455
Geo. P. Reintjes Co., Kansas City, Mo.	417
Reliance Electric & Engineering Co., Cleveland	245, 270
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Rockbestos Products Corp., New Haven, Conn.	219
Rollway Bearing Co. Inc., Syracuse, N. Y.	207
Rust-Oleum Corp., Evanston, Ill.	244
Scott Paper Co., Chester, Pa.	430
Selas Corp. of America, Dresher, Pa.	46
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Simonds Abrasive Co., Philadelphia	539
Simplex Wire & Cable Co., Cambridge, Mass.	440
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United Food Management Services Inc., Cleveland	336
Valvair Corp. and Sinclair-Collins Valve Co., Akron	
E. H. Wachs Co., Chicago	443
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John Waldron Corp., New Brunswick, N. J.	435
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L. J. Wing Mfg. Co., Linden, N. J.	95
Yale & Towne Mfg. Co., Philadelphia	479, 491
York-Gillespie Mfg. Co., Pittsburgh	545

JALTEN
gives equal strength with lighter weight

High-fatigue loads increase payloads. Jalten steel in truck, trailer, and bus frames reduces over-all weight and induces low-cost operations.

Low alloy, high strength Jalten offers good formability coupled with excellent corrosion and abrasion resistance

Jalten's high strength permits high design loads. It also permits a reduction in section when used to replace mild steels. Usually the reduction amounts to two gages affording a weight savings of approximately 25 per cent. Thus, dead weight can be eliminated—resulting in increased carrying capacity. Also, it is easily welded.

Jalten is furnished in four grades:

No. 1—possesses high strength, good formability and fabricating qualities—good resistance to low temperature impact.

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No. 4—provides superior formability and surface quality for bumper stock applications requiring plating.

Jalten Steels are available as sheets, strip, plates, structurals, bars and small shape sections.

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Chemical properties of Jalten
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STEEL CORPORATION · PITTSBURGH

J&L STEEL

- Nuclear know-how for the steel industry.
- How big are the top charge electrics going to get?
- Proportioning air to blast furnace tuyeres.
- Matching roll speeds on hot strip finishing mills.
- What causes surface staining in cold rolled steel?
- Rod drawing at extreme speeds.

What Steelmen Are Saying

The technical papers previewed here will be delivered in Cleveland next week at the annual convention of the Association of Iron & Steel Engineers

MANY a conversation at the AISE convention in Cleveland will swing around the papers previewed below. They capture the picture of a rapidly expanding industry.

Today's steelman wants facts to grow on (like those below). They offer ample evidence that steelmaking, big as it is, is not dragging its feet.

Blast Furnace

Tuyere Air Proportioning for the Blast Furnace—Proportioning the air blast to the tuyeres of a blast furnace has been made possible by today's control techniques and materials. Air proportioning is based on the premise that uniform blast to the tuyeres of a blast furnace is as important a factor in optimum operation as is uniform raw material sizing, analyses and distribution. The typical blast furnace does not receive its wind in a uniform manner from its tuyeres.

In an effort to achieve uniformity of blast, a proportioning system was installed on the Gary No. 1 blast furnace and experiments were carried out. It was found necessary to modify the equipment. Subsequently, three additional furnaces were equipped with apparatus which differs from the original equipment.

Air proportioning is practical in all respects. Like any new development, problems had to be solved. Desirable refinements were developed and installed in the field.

When the first system was installed, it was anticipated that uniform blast would result in more uniform gas and stock flow. It was believed that this, in turn would result in uniform wear on the furnace lining. Further deductions were: 1. Lining life would be substantially increased. 2. Wear on the lining walls would result in the maintenance of good working furnace lines throughout the major portion of the campaign. 3. The net result would be the ability to maintain normal high production rates, low coke rate and high yield.

All furnaces with air proportioning are still in operation. No. 1 furnace, the oldest, is operating on an extended campaign. To date, the anticipated benefits are being realized as indicated by lack of one-sided operation, more uniform gas flow as judged by stack thermocouples and quicker return to normalcy after an upset.

In summary, air proportioning is a practical way to achieve uniform blast flow to blast furnace tuyeres. Justification should be attained by long term benefits of longer lining life without substantial deterioration, plus the intangible gains of more uniform furnace operation.—E. K. Miller Jr., assistant division superintendent, blast furnaces, Gary Steel Works, United States Steel Corp., Gary, Ind.

Automatic Split-Wind Blowing—Latest step in the blast furnace blower replacement program at the Duquesne (Pa.) Works, U. S. Steel Corp., was the installation of a 125,000-cfm turboblower with automatic split-wind control equipment. This equipment enables the blower to serve any two or three furnaces. The control equipment is pneumatic, and is made up of proved components arranged to maintain set point air flows to each furnace and at the same time

EVERY TIME I SEE BALDY HE'S TAKIN' ANOTHER PULL AT THAT TAP. HE MUST 'A BEEN BORN THIRSTY.
HE AIN'T THIRSTY. HE JUST USES WATER TO FLOAT DOWN THEM SALT TABLETS.
YEH, EVER SINCE STASH TOLD 'IM THEY'RE MADE OUT'A ASBESTOS HE THINKS HE'S INSULATIN' HISSELF.
SALT TABLETS
THANKS TO C.A.GREENLEE
KUEKES

The Camel

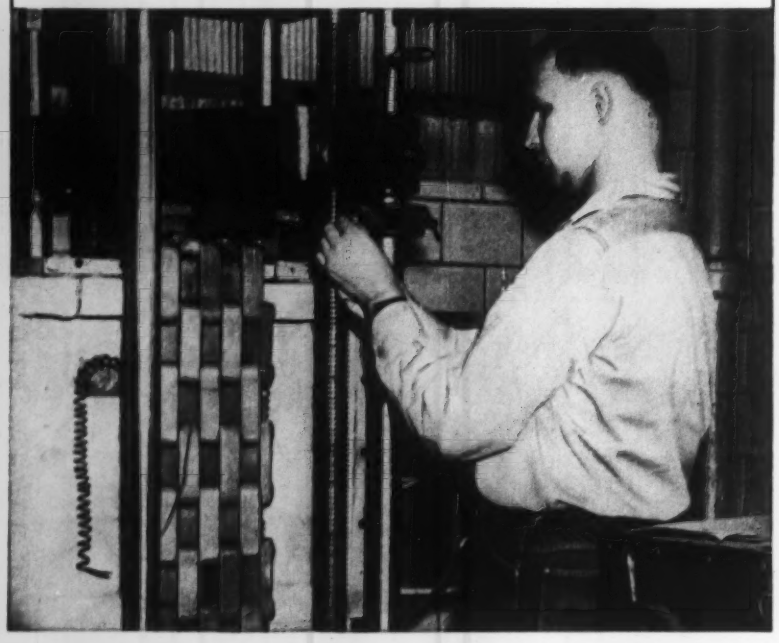
WHY NOT DESCRIBE YOUR OPEN HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO

THERMALLOY* quality control at work

torture chamber



Up to 30 tons' tension... to test conveyor belt life

In the Electro-Alloys physical laboratory, a Thermalloy conveyor belt is being set up for testing in a hot, tensile test furnace to determine load limits. Tension up to 30 tons can be applied here. This laboratory also carries on Brinell testing, tensile tests as cast, after-aging and stress rupture tests.

Testing of this type in our physical laboratory is just one phase of research and quality control at Electro-Alloys. Our Elyria plant has a completely equipped metallurgical laboratory for study of heat and abrasion problems encountered by our field sales engineers.

Let us put our facilities to work to solve your heat-treat problems—call your local Electro-Alloys representative or write for a copy of booklet T-225. Electro-Alloys Division, 7049 Taylor Street, Elyria, Ohio.

*Reg. U. S. Pat. Off.—designating not just one but a group of alloys—each developed to meet specific heat and abrasion problems.

HEAT-RESISTANT CASTINGS • TRAYS • MUFFLES RETORTS • CONVEYOR BELTS • RADIANT TUBES

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
Elyria, Ohio

hold blower discharge pressure at the lowest level to satisfy the blast pressure required at each furnace.

Air flow to each furnace is measured by an orifice plate and is corrected to standard conditions by automatic compensation for temperature and pressure. Air flows to the furnaces are regulated by 42-in. butterfly control valves which are positioned by pneumatic cylinders receiving signals from flow controllers. These compare the air demand signals as established by panel mounted blowing set points to actual air flows transmitted by air flow recorders. Any unbalance between these two signals causes the output signal from the flow controller to restore balance by positioning the butterfly control valve.

The control automatically selects the furnace requiring the highest blast pressure and holds the butterfly control valve for that furnace wide open. Air flow to this furnace is then controlled by varying blower speed while air flow to the other furnace is controlled by throttling its butterfly control valve. This method of split-wind control results in minimum blower discharge pressure.

The split-wind control panel provides the blowing room operator with all meters, indicators and controls for each of the three furnaces. Blowing rates are easily changed. Checking the furnaces for casts, etc., is accomplished by separate controls, eliminating the necessity of changing the blowing set points.

Operating performance of the split-wind control system has proven reliable, accurate and economical.—James S. Frazer Jr., general superivsor, power & fuel, Engineering Department, Duquesne Works, U. S. Steel Corp., Duquesne, Pa.

Reducing Delays During the Blast Furnace Campaign Through Mechanical Improvement — As campaign life of the blast furnace has been extended through improvements in lining materials, mechanical features which formerly were satisfactory are now

Yale "integrated design"

now offers you a complete line of fork lift trucks with

PREMIUM ENGINEERING ADVANCES AS STANDARD FEATURES

for fast, more efficient handling

Yale "Integrated Design" Trucks include all the critical features necessary to give you the best possible truck performance. For example, these new Yale models feature roller-type channel uprights to minimize friction, an anti-cavitation valve to eliminate channel sway and four side-thrust rollers on the carriage to reduce stress due to off-center loading. For faster, smoother starting and lifting, new fully automatic Yale Torque Transmission on Gas Trucks instantly supplies extra power when needed. For fast, safe stops, self-adjusting hydraulic brakes of increased capacity are mounted directly to each drive wheel. A special independent mechanical safety brake is operated by a lever conveniently located for immediate emergency use.

for maximum safety and ease of operation

The operator finds driving a Yale "Integrated Design" Truck easier because he is given more visibility. The lowered cowl and recessed, adjustable seat add to the visibility and protection of the operator. For multi-function attachment operations, Yale "Integrated Design" locates the hose take-ups inside the uprights for protection and increased visibility, and allows for easy installation of a *single* control lever with push-buttons next to the lift and tilt controls, permitting easy right-hand operation.

ADDITIONAL IMPORTANT FEATURES NOW STANDARD ON YALE "INTEGRATED DESIGN" TRUCKS

- **Special rolled channels** with thick flange section for long wear.
- **Flow-regulator Valve** for smooth lowering action without excessive speed.
- **Waterproofed Instruments** centrally grouped for easy reading.
- **Dead-man Control** on electric models for extra safety.
- **Magnetic Cam-A-Tactor Controller** on electric models for smooth acceleration.
- **Maximum Interchangeability of Parts** among all Yale Gas Trucks and all gas and electric models of comparable capacities to permit a smaller spare-part inventory.

New Yale Gas Trucks are available in capacities from 2,000 to 8,000 lbs. with Fluid Coupling, Standard or fully automatic Yale Torque Transmission. New Yale Electric Truck capacities range up to 10,000 lbs. Write for complete, detailed specifications: The Yale & Towne Mfg. Co., Philadelphia 17, Pa., Dept. 89.

YALE*

INDUSTRIAL LIFT TRUCKS AND HOISTS

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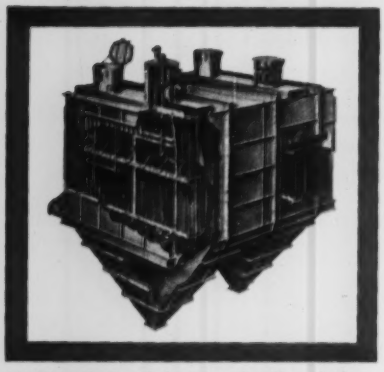
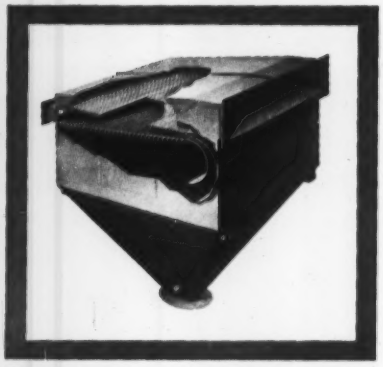
Gas, Electric & LP-Gas Industrial Lift Trucks • Worksavers • Warehousers • Hand Trucks • Hand and Electric Hoists

How Buell delivers the EXTRA PERCENT in Dust Collection Efficiency

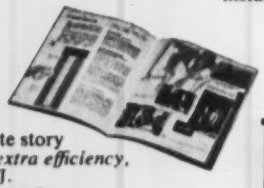
In any cyclone dust collector there is an upward eddy preventing the separation and dropping-out of a percentage of particles. But in Buell Cyclones, the exclusive Buell shave-off design *harnesses* this up-flow—puts it to work! Result: extra efficiency without extra operating cost!



SF Electric Precipitator, a Buell exclusive, also delivers *extra efficiency* due to unique Spiralectrodes and continuous cycle rapping.



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for either natural or forced draft installations.



For the complete story behind Buell's *extra efficiency*, write Dept 26-J.
Buell Engineering Company,
70 Pine Street, New York 5, N.Y.

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MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in
DUST COLLECTION SYSTEMS

AISE ABSTRACTS

having to be renewed or replaced.

Items such as skip bridge rails, skip sheave wheels, bleeder valves, receiving hopper wearing plates, small bell, seat, large bell, downcomer, bosh plate nipples, and bell cables have been a source of maintenance or delay at Inland Steel Co., East Chicago, Ind. All have been improved.

In some cases improvements have lasted the life of the campaign; in others, replacement time or frequency of replacement has been reduced. The solution for some items which fail has not been satisfactory.—W. O. Bishop, superintendent, and Charles P. Frame, mechanical foreman, Plant 2 blast furnaces, Inland Steel Co., East Chicago, Ind.

Open Hearths and Electrics

Results with Hollow Electrodes in Electric Steel Furnaces — Several years ago, National Carbon Co. initiated a research program for the purpose of studying the physics of electric arcs in the laboratory and on production furnaces. One objective was to investigate the erratic behavior of these arcs and its effect on the power released in the arcs.

Experiments with hollow electrodes indicate that the performance of the arc is influenced by the geometry of the electrode tip. This, in turn, influences melting rate, power consumption, load surges and electrode consumption. —W. E. Schwabe, Product & Process Development Laboratory, National Carbon Co., Niagara Falls, N. Y.

Economic Future of the Large Top Charge Electric Furnace—The future of the electric furnace is dependent to a large degree on scrap. As long as the large furnace is dependent on a 100 per cent scrap charge, its future tonnagewise is limited. A second factor is that scrap both here and abroad is becoming more and more contaminated with tramp inclusions. However, the future of the electric furnace is not as bleak as would be indicated by a look at the

FEEDING anode on Anaconda Type CP Cable into manhole to protect lead-covered cable.

Why let corrosion steal your investment in metals —when protection costs so little

Although many people are unaware of it, corrosion of buried metals is caused by tiny stray electric currents that flow from the metal into surrounding soil or water, carrying particles of the metal with them. Corrosion can be checked by applying direct current from an outside source; the metal surface becomes negative to the surrounding soil or water and stops the flow of current from the metal.

This is called Cathodic Protection—which eliminates corrosion of metal-covered cable, pipelines, storage tanks, water tanks, ships' hulls and other buried or submerged metal products.

To perform this job, Anaconda has developed a special Type CP Cable. Jacket of polyethylene and DENSHEATH* (PVC) insulation offer top resistance to moisture and soil acids . . . double protection affords longer cable life. Anaconda also offers a special one-layer insulation and jacket construction of polyethylene for special applications.

For more information on how Cathodic Protection checks corrosion, and detailed information on ANACONDA Type CP Cable, write for Bulletin DM-5450. Also, use ANACONDA DURASHEATH* neoprene-jacketed cable for buried or aerial distribution lines feeding power to CP systems. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Reg. U. S. Pat. Off. 56550Rev.

SEE THE MAN FROM **ANACONDA**®
FOR **CATHODIC PROTECTION CABLE**

Instant automatic heat solves chilly morning problem in Texas

Early morning temperatures go below freezing during part of the year in Texas but, as the sun climbs, the thermometer quickly rises to 75° and higher.

To take care of such rapidly changing conditions, Oil Well Supply Division of United States Steel Corporation chose Dravo *Counterflo* heaters for their Garland, Texas plant and warehouse. The six 2,000,000 Btu per hour heaters provide heat instantly during the chilly morning hours and stop automatically when comfort temperatures are reached—no delay, no wasted fuel.

Dravo *Counterflo* heaters require minimum capital investment, low installation costs, and are economical to operate. For specific help on a problem involving any of the Dravo products and services shown below, write DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

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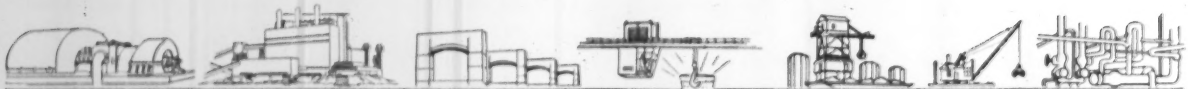

Blast furnace blowers · boiler & power plants · bridge sub-structures · cab conditioners · docks & unloaders · dredging · fabricated piping

foundations · gantry & floating cranes · gas & oil pumping stations · locks and dams · ore & coal bridges · process equipment · pumphouses & intakes

river sand and gravel · sintering plants · slopes, shafts, tunnels · space heaters · steel grating · towboats, barges, river transportation

scrap picture alone. Several alternate sources of charge materials may possibly be used, if more rapid expansion of such furnaces is to take place. These are:

1. Development of hot metal practice in arc furnaces.
2. Expansion of production of hydrogen reduced ore.
3. Use of desiliconized hot metal.
4. Production of electric furnace pig iron in new designs which lower consumption of power from 2500 to 1000 kw-hr, and which promise an increase in the daily output from 200 to 500 tons.

In addition, in considering the economic future of the electric furnace, consideration should be given not only to open hearth hot metal, but to the top-fired horizontal oxygen-fired converters.—William B. Wallis, president, Lectromelt Furnace Co., a McGraw Electric Co. division, Pittsburgh.

Fuels and Power

Nuclear Technology and the Steel Industry — As the sixth largest consumer of electricity and as a large consumer of direct heat, the steel industry must be concerned with the economies of nuclear energy. Proposed: A basis for selecting areas in steel operations where nuclear energy may be expected to appear and when.

Various technological aspects of the nuclear industry are applicable to the steel industry. Examples are liquid metal cooling, nuclear excitation as a chemical analysis procedure and isotope applications.

The potential requirements for special materials for reactors is estimated, and some of Republic's efforts in this field described.—R. P. Peterson, director, nuclear research, Republic Steel Corp., Cleveland.

Automatic Fuel Control—Prior to Jan. 1, 1955, Alan Wood Steel Co., Conshohocken, Pa., had a long history of selling by-product coke oven gas to a local utility for domestic heating purposes. When notified that the contract was to

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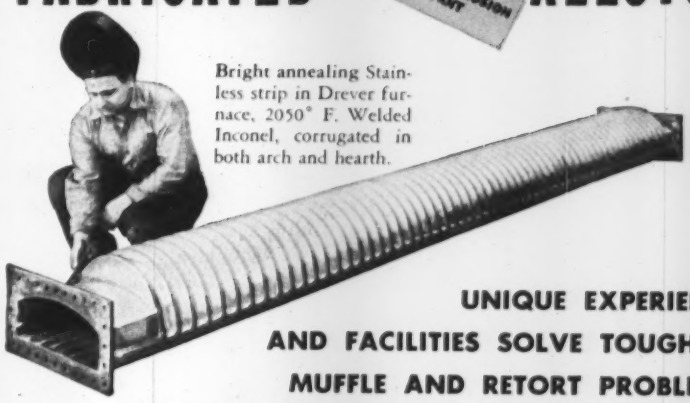
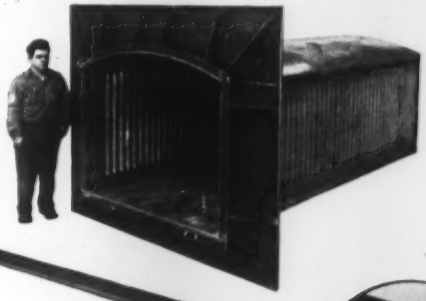


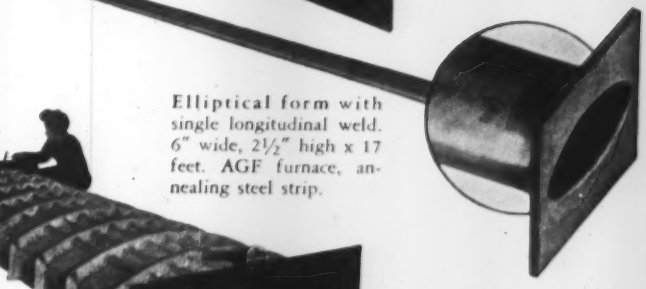
Bright annealing Stainless strip in Drever furnace, 2050° F. Welded Inconel, corrugated in both arch and hearth.

UNIQUE EXPERIENCE AND FACILITIES SOLVE TOUGHEST MUFFLE AND RETORT PROBLEMS

Here are four examples from current production, each featuring unique Rolock fabricated welded design and construction . . . each assuring far longer service life, positive gas-tightness and stability at high temperatures. Rolock's wealth of experience and special skills are at your service. Quality standards maintained by the use of pressure testing, X-ray, penetrant die and other forms of inspection. Call or write for our new comprehensive catalog-data book.



Brazing aircraft wing assemblies in Hydrogen atmosphere, Holcroft furnace. Gas-tightness essential. Max. temp. 2150° F.



Elliptical form with single longitudinal weld. 6" wide, 2½" high x 17 feet. AGF furnace, annealing steel strip.

2700-lb. muffle, corrugated, welded fully annealed after fabrication. Rockwell furnace, continuous annealing at 1600° F.

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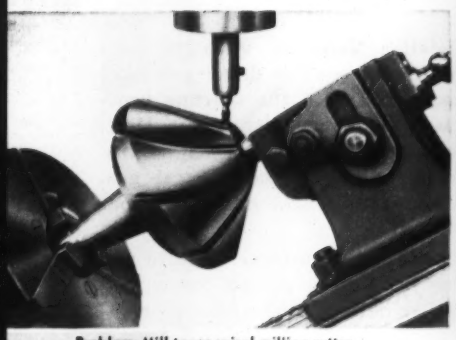
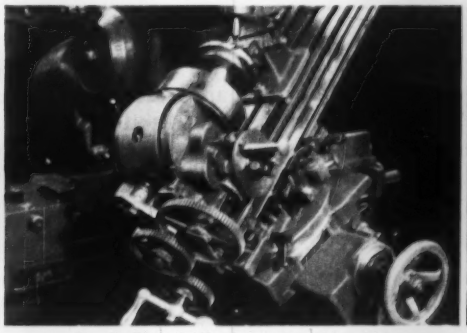
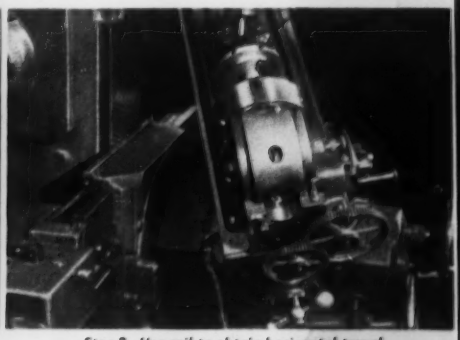


Problem: Mill taper spiral milling cutter.
Step 1. Tilt table to obtain uniform depth of flutes.



Step 2. Gear dividing head to provide spiral.



Step 3. Use rail to obtain horizontal travel.

SPECIFICATIONS

Table feed	17"
Knee Slide feed	17"
Total horizontal feed	34"
Transverse feed	5¾"
Vertical adjustment	15"
Axial hand feed of Omniversal Milling Head	2"

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Brown & Sharpe B·S

Close-up shows two of five pairs of Ajax Dihedral Spindle Couplings driving 23" and 56" x 52" 4 high 5 stand tandem cold mill built by United Engineering & Foundry Co. for Weirton Steel Co., a Division of National Steel Corporation.

▶ The critical eyes of steel men are focused on the design, performance and output of every new mill and all its components. This new 4 high, 5 stand tandem cold mill, designed for speeds up to 7200 fpm, was built by United Engineering and Foundry Co. for the Weirton Steel Co., a Division of National Steel Corporation.

It is turning out sheet of high quality finish and maintaining close gauge tolerance.

Power is transmitted from drive stands to rolls by 10 Ajax Dihedral Spindle Couplings handling 2500 H. P. each. The uniform angular velocity of Ajax Dihedral Spindle Couplings is an important factor in producing smooth finish, uniform thickness and long roll life.

Ajax Dihedral Spindle Couplings are in operation in America's foremost steel mills. They have been proved and approved by every test of time and service. Whether you are designing, specifying, building, using or modernizing mills, it will pay you to get the facts on Ajax Dihedral Spindle Couplings. *Write for Bulletin No. 58.*

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AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, N. Y.

AISE ABSTRACTS

be terminated, intensive studies were made as to the use of fuel within the plant so that intelligent plans could be made for the use of this gas without waste.

The open hearth furnaces now are automatically using a balance wheel for the system, or a dumping ground for all gas that is not used in other departments.

All the first helper has to do is set his board for the total amount of fuel he wishes to burn, and at the percentage of this total that he wishes to be coke oven gas, then make sure that all instruments are set on automatic. From that point, the instruments take over.

A unique feature of the control system is the ability of the operator to preset the sequence of furnaces automatically starting to use coke oven gas when it becomes available. The company has benefited considerably from the new system.—D. R. Mathews, open hearth superintendent, Alan Wood Steel Co., Conshohocken, Pa.

Relative Value of Various Gases for Scarfing—The flame generally associated with the scarfing process is the oxyacetylene flame. However, other fuel gases, such as propane, hydrogen and natural gas, are available and are often considered.

Propane, a propane mixture and acetylene were chosen for a field test to determine the most economical fuel gas. The results show that the cheapest fuel gas per thousand Btu is not necessarily the most economical. Investigation of preheat oxygen requirements, flame temperature and total cost of fuel gas and oxygen offer a more complete check of a fuel's value.

Little difference was found so far as total oxygen and fuel gas cost are concerned. The propanes were the cheapest fuel gases tested, but required the largest quantities of preheat oxygen. Acetylene gas cost was greater than the propanes, but its oxygen consumption was lowest.—W. M. Bloom, combustion engineer, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

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AISE ABSTRACTS

Annealing and Heat Treating

Surface Staining of Cold Rolled Steel—Part I—A major surface defect of annealed cold-rolled steel is a narrow gray-to-black zone of stain near and parallel to each edge of a coil, and separated from the edge by a bright area ½ to 1 in. wide.

The black band, known as "snaky edge," "edge smudge," "carbon edge," or "shadow edge," makes the strip unsuitable for terne plating, certain types of galvanizing or lacquering. Despite its common occurrence, mill variables are so numerous and difficult to control that the cause and cure of this defect had not been completely established.

The study began by first establishing conditions under which the defect is formed, and, second, discovering the combination of factors by which the defect might be removed from the sheet surface.

Findings: Snaky edge forms independently of variations in the type and amount of rolling oil and/or detergents. Also, the reaction occurs on a strip surface which has been mechanically and chemically cleaned, indicating that the presence of surface impurities carried over from continuous pickling and cold rolling are not required for the formation of the defect.

The sharpness of the demarcation line between the dark and bright areas on both commercial and experimental material indicates a temperature-dependent chemical reaction. The location of the defect near the edge of the coiled strip may be thought of as the result of a combination of temperature gradient from edge to center of the coil and of limited access of the annealing gas. A temperature gradient is more important than a definite temperature of formation.

The resistance of the black area to reduction by DX gas and by hydrogen gives a clue to its persistence throughout the long annealing process, and implies that the defect is formed on the heating cycle.

Conclusion: The composition, header pressure and rate of flow of the annealing gas are the com-

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mercially controllable factors by which the formation of the defect may be minimized.—C. R. Lillie, research metallurgist, and D. W. Levinson, supervisor, Nonferrous Metals Research, Armour Research Foundation of Illinois Institute of Technology, Chicago.

Normalizing and Heat Treating of Steel Plate — The production of steel plate represents a sizable fraction of the nation's total steel output. Last year it amounted to over 6.5 million tons. Little of this production has been shipped from the mill in the heat treated condition, but plate of this quality is receiving increasing attention and production is rising.

It has acquired a large number of uses (pressure vessels, earth moving machinery, mining machinery, buildings and bridges). As the advantages of high strength combined with light weight are brought to the attention of designers, use is bound to grow.

Last year, the first high output, fully automatic, continuous heat treating plant for plate began operation. By the end of this year, a second completely integrated plant will be producing low carbon and alloy steel plate, either normalized or fully heat treated.

The production line will include a hardening furnace, a tempering furnace and a pressure quench, all of the roller-hearth type. Plate is fed continuously, but upon finishing its heating and soaking period, it is discharged (one plate at a time) at high speed to the pressure quench. There it is cooled quickly under pressure to keep the desired flatness. — Horace Drever, president, and N. K. Willis, chief engineer, Drever Co., Bethayres, Pa.

5-inch, single-pass design. Top segment is cut away to show inner construction.

fixed-bundle heat exchanger

provides greater capacity per square foot of surface

It's new — *but field-proven!* It upholds Yates-American's 74-year reputation for top quality.

Features like these protect your investment:
Tubes are bonded to flanged baffles, to eliminate vibration wear.
Tube joints are rolled, for permanently tight connections.
Copper and copper alloys are used throughout, for long service life.

2" to 10" sizes — single-pass, 2-pass, and 4-pass designs — are now in production. Other fixed-bundle models available on special order. *Removable-bundle types soon in production.*

Bulletin HT-1 gives detailed information. Send coupon for your copy.

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10

Rolling Mills

Automatic Control on a "Z" Mill— Installation details and performance of an integrated system of automatic gage control and production analysis equipment installed on a 26-in. Sendzimir mill are discussed and illustrated. The system has a unique way of maintaining precise gage control and has several new approaches to the tabulating of product quality data.

The gaging medium used to detect strip thickness is x-ray in principle, one unit on each side of the mill. The gages feed a signal to a unit which varies the payoff or back tension within preset limits to compensate for small variations in strip thickness detected by the exit gage. If deviations from the nominal size are outside of the range of the tension control, automatic corrections are made to the screwdowns, to keep the exit stock on gage.

For production analysis, accumulating footage counters are provided on the operator's desk to show the total, undersize, oversize and on-gage footage. Repeater printing counters operate with a card printing attachment which provides a permanent numerical record of the condition of the coil produced. A direct reading recorder chart, proportional in length to strip footage, indicates the exact thickness of the material at any specific location in the coil.

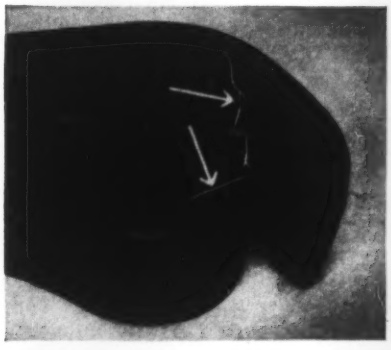
The control and production anal-

WATCHING YOUR WEIGHT can be important—especially in the aircraft industry. Excess weight can reduce the range and payload of a plane. A major aircraft manufacturer uses M Sonizon units to ultrasonically measure thickness of sheet and formed shapes. This controls weight by eliminating excessive thickness.

Case Studies: NONDESTRUCTIVE TESTING SYSTEMS

Magnaglo and "black light" show up cracks as glowing indications on rough castings at a Peoria, Illinois foundry.

How Nondestructive Testing Helps You Make Better Products . . . Cheaper



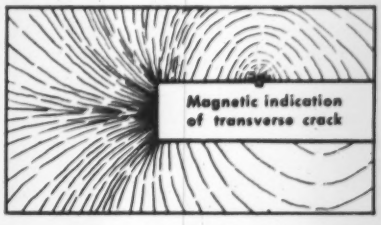
HEAT CRACKED THE JAW—The jaws of steel strapping machines must be reliable. Yet, following the heat treating, invisible cracks were discovered with Magnaglo as shown above. Immediate correction of the heat treat cycle eliminated the cracks. No further machine time or labor was expended on defective jaw parts, since none were made, and none scrapped!!

Most manufacturers can achieve definite, worthwhile savings by using one of the M testing systems for improved production control. These nondestructive inspection methods include: Magnaflux, for wet or dry magnetic particle inspection; Magnaglo, fluorescent particle inspection; Magnatest, eddy current electronic testing; Zyglo, fluorescent penetrant inspection; Spotcheck, dye penetrant inspection; Sonizon, for ultrasonic measurements; and others.

The M testing systems are equally effective for preventative maintenance or manufacturing inspection.

Most manufactured products contain one or more types of casting, forging weldment, machined or formed part. Where cracks cannot be tolerated in the final product, maximum production economy must be obtained from the very outset. Defects must be discovered as early as possible in order to eliminate wasted effort in final processing or assembly.

Magnaflux methods pinpoint early defects, and help you eliminate their cause. This results in savings of time, labor and additional long range benefits from increased salvage and reduced amounts of scrap. For detailed information as to how one of the M inspection methods can help you produce better and save more, write or call for an interview with a Magnaflux engineer. No obligation, of course!



HOW MAGNETIC FORCE DETECTS MECHANICAL DEFECTS

M nondestructive testing is based upon simple magnetic principles. A part to be tested is first magnetized—then magnetic powders or fluorescent particles in oil are applied. Surface defects cause a break in the magnetic field—local magnetic poles cause particles to be held on part to mark extent of defect. Above—a Magnaglo indication on truck connecting rods.

HALLMARK OF QUALITY IN NONDESTRUCTIVE TEST SYSTEMS

Write for complete details concerning any of the above case studies, or ask for our new booklet on "Lower Manufacturing Costs."

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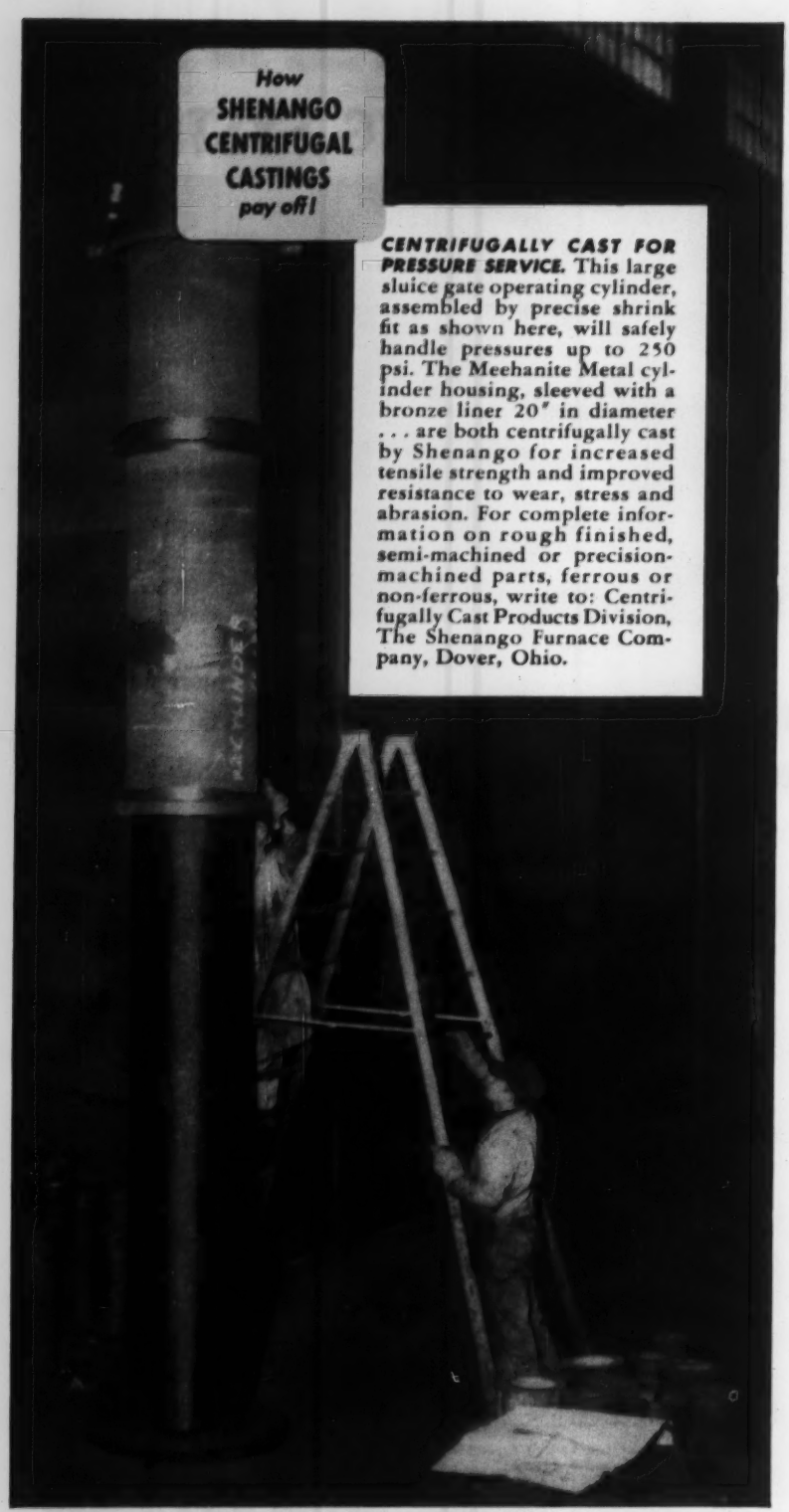
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MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

AISE ABSTRACTS

ysis signals and functions have been integrated to provide automatic reversing and reset as the mill changes direction for successive passes.—J. W. Hopper Jr., gage application engineer, Pratt & Whitney Co. Inc., West Hartford, Conn.

Electrical Features of a Reversing Rougher—The finishing train of the 90-in. hot strip mill at Granite City Steel Co., Granite City, Ill., is preceded by a universal roughing mill with unusual electrical features for speed matching between horizontal and vertical rolls with a reduction range of 10 to 55 per cent.

The mill motors and generators were originally specified for a conventional close-coupled drive with a reduction range of 10 to 25 per cent, and all motors were to be supported from a common bus.

To accommodate the original machines in a precise speed matching scheme, preset motor fields on both the main mill and edger were used, with speed matching obtained through edger droop control and reduced edger generator voltage control.

Automatic preset screwdown control is used on both the main mill and edger. The main mill preset screwdown control is used to permit preselection of the edger voltage most compatible with the main mill draft to be taken on a particular pass.

Using a preset edger motor field with edger generator voltage control proportional to main mill draft, the addition of a separate edger droop control obtains a precise speed match without danger of serious edger overload. A further advantage gained from preset motor field operation is the reduction in reversal time at all foot master positions, since slow motor fields do not have to be changed.—J. H. Greiner, application engineer, Electrical Application Department, and A. Mozina, engineer, Control Section, Allis-Chalmers Mfg. Co., Milwaukee.

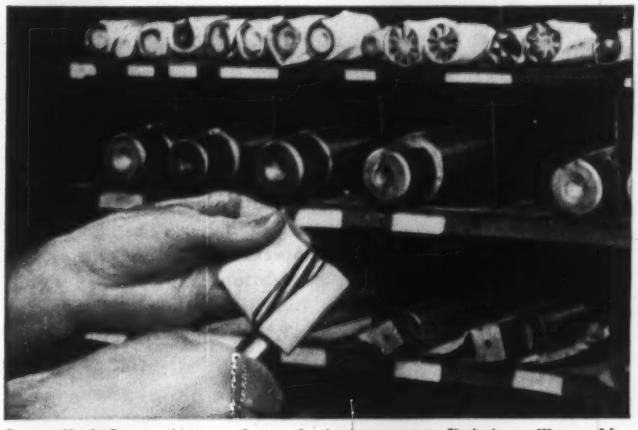
Mill Products

Greater Flexibility for Wire Drawing—At the Steel Co. of Canada's new Parkdale Works at Hamilton, Ont., extremely high finish speeds

Polyken Tapes have CONTROLLED STRENGTH*

(and that's what saves the money)

Controlled Strength aids fabrication work. No rejections due to scratches or rough fragments left on stainless steel by this punch-press operation, thanks to the superior cushioning and abrasion-resistance of low-cost Polyken Tape No. 113. Speedy, clean removal.



Controlled Strength guards tools in storage. Polyken Tape No. 133 provides a durable cloth backing for sharp cutting edges . . . yet it pulls off clean and quick when the tools are ready for use.

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Because you can select the right *Polyken* Tape for the right job, you get all the sticking power . . . all the tensile strength . . . all the tear resistance you need.

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CAPACITIES: from ⅛ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

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Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

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CM HOISTS AND CHAIN

AISE ABSTRACTS

(in excess of 4000 fpm) have been attained on new continuous rod drawing machines. Placed in operation early in 1956, they incorporate the latest advances in machine design and electronically controlled drive equipment.

From the early 1920s to date, the ferrous wire industry has seen the speeds of continuous rod drawing machines advance from 350 fpm to over 3000 fpm. It has been an evolution marked by a continuous process of alternately improving machine design, the electrical drive system and operating practices.—R. C. Suttle, application engineer, Reliance Electric & Engineering Co., Cleveland, and Maurice A. Nye, chief engineer, Vaughn Machinery Co., Cuyahoga Falls, O.

The Calmes Process for Seamless Tubemaking—The main operations of the seamless tubemaking process at Phoenix Iron & Steel Co., Phoenixville, Pa., are the ingot heating, press piercing, skew roll elongating, rotary forging, reheating, sizing, polishing and finishing. The mill was designed to make seamless tubes from 5½ to 16 in. in diameter with a wall thickness of ¼ to 3 in., using round corrugated ingots up to 8000 lb. It was also designed to manufacture quality pipe with close tolerances on both the outside diameter and wall thickness, using cast ingots as the raw material. Press piercing, skew roll elongation and rotary forging work together on one heating cycle to give this desired feature.

The hydraulic piercing press was selected as the only known means to pierce cast steel ingots without creating inside laminations or fissures. It adds homogeneity to the steel structure and helps to increase the tube yield of the cast ingot. The hot ingot is received by the piercing press, inserted into a container and a hole pushed into it with brute force. The container determines the outside diameter of the bottle and the punch determines the inside diameter.

The bottle is conveyed from the piercing press to the elongator, where the pipe is rolled over a piercing point with rolls similar

Vaughn MOTOBLOC® MOTOBLOX®

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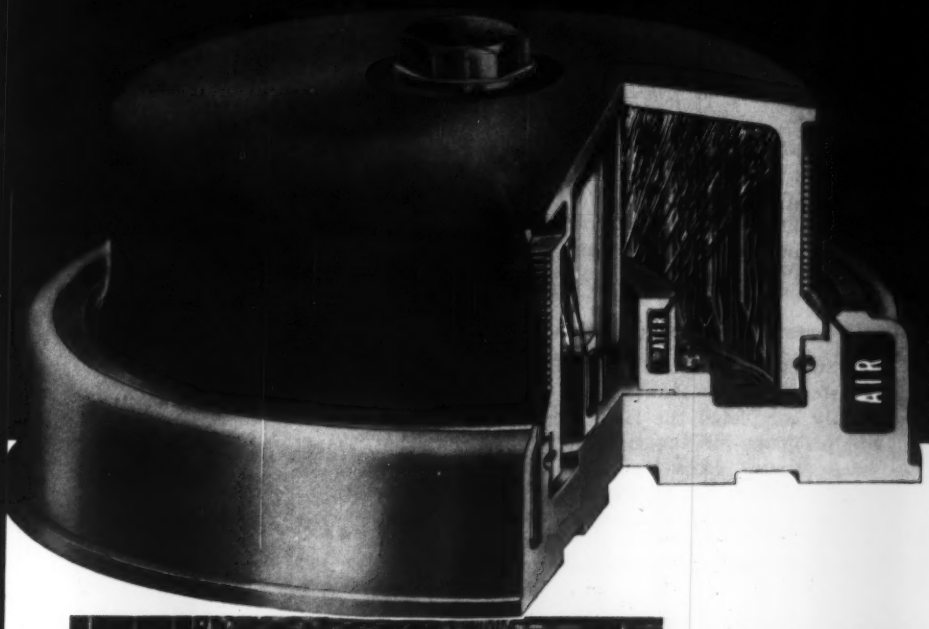
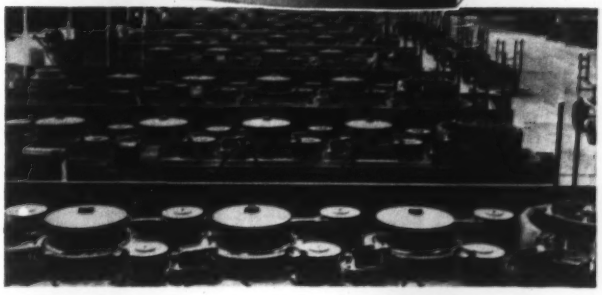


for perfect wire condition from start to finish!



Vaughn DOUBLE-COOLED blocks insure desirable temperatures for high carbon wire all the way through the draw—thanks to advanced engineering that provides *both* air and water cooling. Each block is equipped with an annular air blast for external cooling of the wire, while water jets impinging on the inner finned block walls remove heat continuously and effectively.

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AISE ABSTRACTS

to those of the Mannesmann mill. The elongator lengthens and also makes a hollow bloom out of the bottle. These elongator rolls, guides and piercing point were selected because of the high ratio of the diameter to the length of the hollow bloom. However, the elongation is held to 2 or under.

The rotary forging mill (often known as the pilger mill) forms the hollow bloom over a mandrel. The rolls are so shaped as to cause a flow of metal over the mandrel in the direction opposite the rotation of the rolls. A feeder table feeds and rotates the hollow bloom and mandrel to give the pipe a smooth surface. The rotary forging mill determines the outside diameter of the pipe, and the mandrel bars determine the inside diameter.

The Calmes process gives a practical solution to the problem of equalizing the seamless tube. It also holds inside and outside diameters to close tolerances.—Dr. Albert Calmes, Albert Calmes & Co., Milan, Italy, and Clyde Roberts, chief engineer, Phoenix Iron & Steel Co., Phoenixville, Pa.

Safety and Conservation

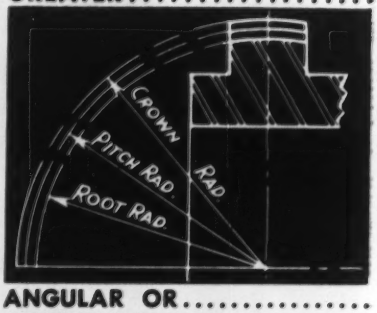
Treatment and Re-Use of Mill Scale Wastes—Armco Steel Corp. recently completed the final step of its program for the treatment of scale wastes from its continuous strip mill at its Middletown, O., plant. Purposes: To conserve water and abate pollution of the Miami river. The program was carried out in two steps.

The first was the installation of a sedimentation basin in 1952, with mechanical collection for the removal of scale and oil from the bar mill wastes only. This sedimentation basin is made up of three parallel chambers. Each is 10 ft x 67 ft 10 in. (effective) x 8 ft 6 in. water depth, based on a design flow of 3500 gpm.

This proved to be an efficient installation. Effluent discharged to the sewer averaged consistently between 40 and 60 ppm suspended solids and 14 to 30 ppm oil. About 70 tons of mill scale per day are being deposited in railroad cars.

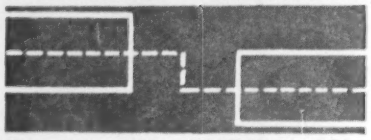
The second step in the over-all program was instituted in 1954 and

PERFECT SPHERICAL TOOTH FORMATION PERMITS GREATER.....



ANGULAR OR.....

.....LINEAR MISALIGNMENT



The Philadelphia SPHEREFLEX COUPLING features a Spherical cut tooth which allows a ball and socket action between mating teeth up to 14° angular misalignment—and due to this angular capacity, a much greater amount of parallel misalignment is possible, which varies directly as the pitch diameter of the gears. All this is accomplished by gearing having a minimum back-lash.

By using Sphereflex Couplings, you can eliminate excessive bearing loads and cyclical bending stresses, which are caused by misalignment between shafts.

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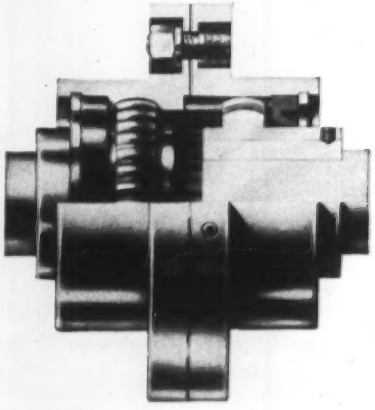

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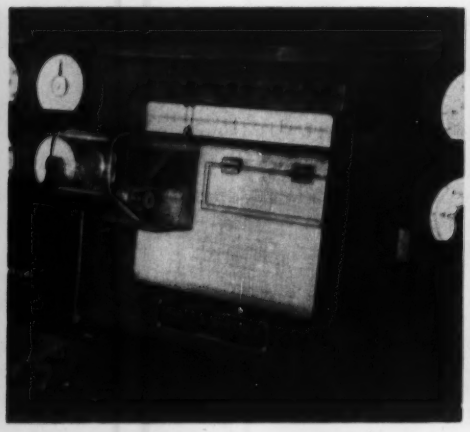
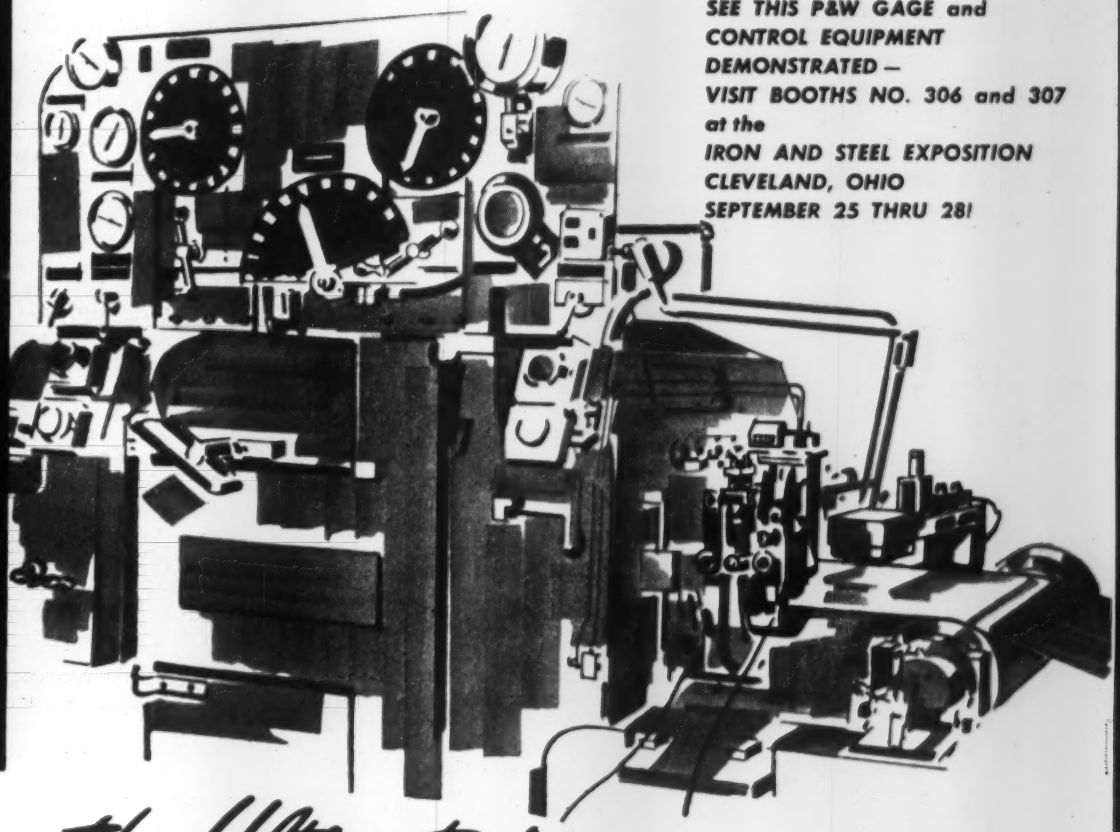
THE X-RAY GAGES and CONTROL UNITS This is a reversing-type mill with duplicate P&W X-Ray Gages on each side. Giving continuous, extremely accurate readings, the gages are non-contacting, cannot mar the most highly finished surfaces. When the gage detects a deviation from nominal strip thickness, it transmits an impulse to the two P&W Control Units which operate to bring the strip back to size automatically. One control corrects the mill screw-down, the other adjusts the tension.



THE RECORDER and INDICATING METERS To provide the permanent production record essential to maintaining rigid, long-term control of strip quality, a P&W Direct-Reading Recorder is incorporated in the installation. This instrument continuously registers *actual strip size* in .0001" increments. As a further check, two indicators (one for each gage) are also provided. These give the mill operator a continuous reading of *strip deviation from nominal* in .00005" increments.

THE TOTALIZER and CARD PRINTER Incorporated in the Control Desk, a P&W Totalizer gives, at a glance, the totals of oversize, undersize, on-size and complete footage in each coil of strip. Providing a permanent record of these totals, a separate Card Printer is located adjacent to the desk. Following the last pass, the operator inserts a card into the Printer, and the information supplied by the Totalizer – plus the date, time, and operator's number – is automatically printed on the card.



SEE THIS P&W GAGE and CONTROL EQUIPMENT DEMONSTRATED — VISIT BOOTHS NO. 306 and 307 at the IRON AND STEEL EXPOSITION CLEVELAND, OHIO SEPTEMBER 25 THRU 28!

. . . the Ultimate in Automation Gaging

FROM ONE SOURCE, ONE RESPONSIBILITY

. . . COMPLETE AUTOMATIC CONTROL SYSTEMS — ENGINEERED TO MEET INDIVIDUAL REQUIREMENTS EXACTLY — FOR MODERN ROLLING MILLS

THE WALLINGFORD STEEL COMPANY of Wallingford, Connecticut, has built an enviable reputation, specializing in stainless steel strip (and tubing made from its own strip) that meets the rigid specifications of exacting customers. Because their requirements permit no compromise with the highest standards of uniform product quality, Wallingford has always invested in the finest, most advanced equipment available. So Pratt & Whitney Automation Gaging was a logical choice. Applied to Wallingford's Sendzimir Mill, this system provides continuous, non-contacting gaging *plus completely automatic* correction of the mill to maintain strip thickness within required tolerances *at all times!*

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how to
CUT CORROSION LOSSES
a report by Koppers Company, Inc.

Russell C. Stromquist
Corrosion Consultant

Recently, we were asked to recommend protective coatings in a plant on the West Coast. In analyzing their coating and enamel needs, we did our usual survey of the installation. After the survey, the customer's Chief Engineer remarked, "You fellows certainly go to a lot of trouble just to tell us what coating system we should use."

We do—because we know it is good for our customers and, therefore, good for us. Case history records prove clearly that careful study *before* making recommendations insures a better protective coating job at lower annual cost. In analyzing protective coating needs, our corrosion engineers follow a "pre-coating check list" based on experience on thousands of jobs.

* * *

The first step in the pre-application survey is a study of the environment. Specifically, you should always take into account the corrosive atmosphere: such factors as acid fumes, intense sunlight, salt air, etc. Physical environment—exposure to abrasion or impact—also plays an important part in the selection of an effective coating system.

The extent of temperature variation and expected minimum-maximum temperatures are important considerations, since the coating chosen must (a) resist low-temperature embrittlement, (b) resist high-temperature flow and (c) harden properly at service temperature.

The moisture environment too, is important in selecting protective coatings. Besides necessary water resistance, the coating should stand-up under pronounced wet-dry cycles.

A thorough cost analysis is a vital part of any pre-coating survey. Many factors are involved, varying in importance with the specific application. For example, total coating cost—made up of surface preparation and application costs—must be balanced against the cost of periodic maintenance. In some cases, the coated surfaces will not be accessible and coating-life will be a *direct* measure of the life of the material.

The cost of probable shut-down or loss of production time is perhaps one of the most important evaluations that must be made in intelligent selection of corrosion-preventing coating systems. Often, it outweighs the direct replacement costs of materials to be protected.

* * *

This pre-coating check list, detailing the protection required and under what circumstances, is a key factor in the exceptional performance of Bitumastic® coatings. Such thoroughness sometimes leads us to willingly recommend some material other than one of Koppers eleven basic Bitumastic coatings to solve a customer's problems.

* * *

In the next report, we will discuss why surface preparation is so vital to the life and economy of any protective coating. Meanwhile, we'd like to hear about your corrosion problems. Koppers Company, Inc., 1300 Koppers Bldg., Dept. 101J, Pittsburgh 19, Pa. District Offices: Boston, Chicago, Los Angeles, New York, Pittsburgh and Woodward, Ala.

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COATINGS AND ENAMELS

AISE ABSTRACTS

completed in late summer, 1955. It included the final clarification and re-use of all wastes from the bar mill and finishing stands.

Gravity flow is maintained through the sedimentation basin for all bar mill and finishing mill wastes. The effluent from the sedimentation basin is pumped to two (80 ft in diameter) clarifiers for chemical treatment and final clarification. The clarified water is being returned to the mills and used in place of well water on some process units. The sludge from the clarifying units is dewatered on vacuum filters and placed in a railroad car with the heavier scales from the sedimentation basin.—Grant A. Pettit, industrial waste control engineer, Armco Steel Corp., Middletown, O.

Prevention of Gas Incidents—Any effective program for the prevention of gas incidents requires complete planning, efficient organization and continuous training.

To make efficient use of the brief time available, rescue plans must be carefully made. They include trained rescue squads, designation of storage locations where rescue equipment will be kept serviced and available for immediate use, signal systems to call rescue squads to designated assembly areas and plans for co-ordination of all agencies involved in rescue work.

Efficient organization must include the allotment of definite responsibilities to agencies within the plant, such as training bureau, safety bureau, medical staff, equipment service shops and the operating departments.

Training for the prevention of gas incidents will include familiarization with safe practice procedures and the use of check lists developed for the safe handling and consuming of gases. Training of rescue teams must be continuous to maintain efficiency in rescue procedures, artificial respiration, first aid and the use of equipment employed by the rescue squad.—T. A. Watson, assistant division superintendent, Power Production, U. S. Steel Corp., South Works, Chicago.

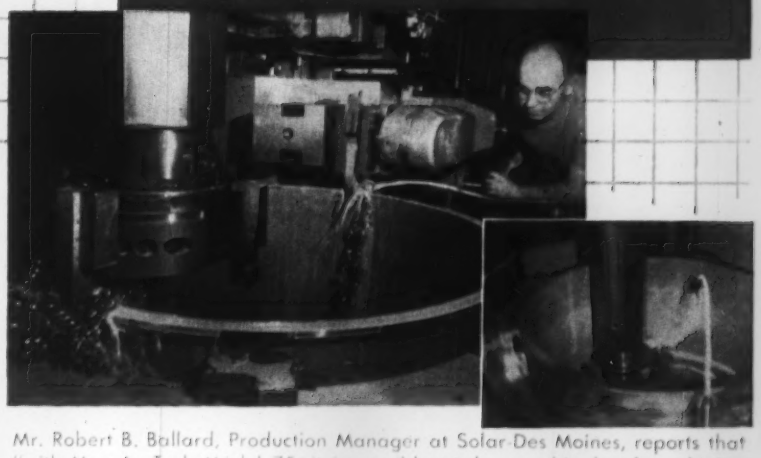
PRODUCTION "at all time Peak"

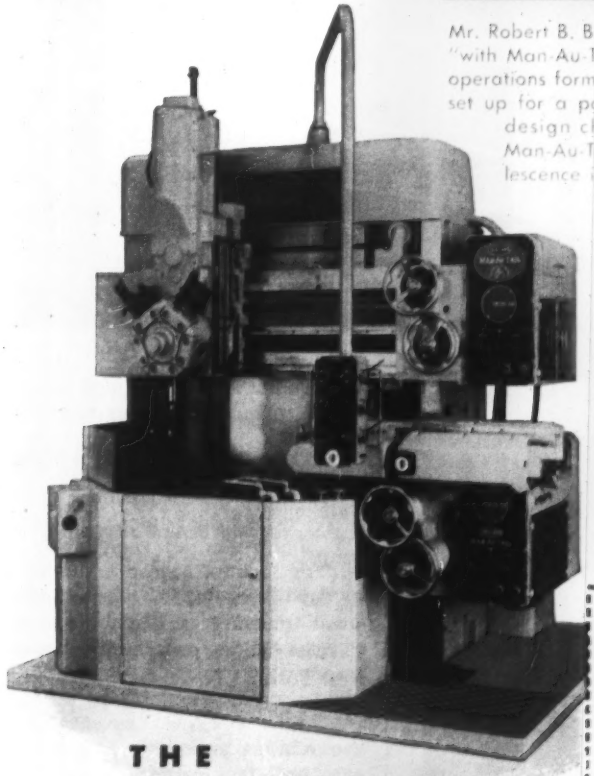
with BULLARD

MAN-AU-TROL VERTICAL TURRET LATHE

MODEL 75

Solar Aircraft Company of Des Moines, Iowa and San Diego, California, has found the versatility and flexibility of the Bullard Man-Au-Trol V.T.L., Model 75 a distinct advantage in the machining and fabricating of various jet aircraft engine parts and assemblies.

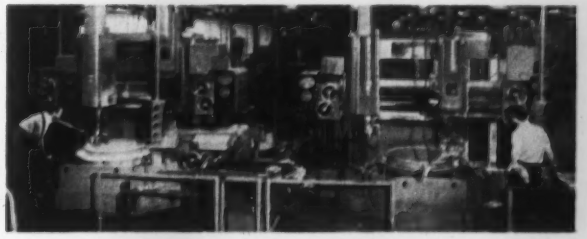




Mr. Robert B. Ballard, Production Manager at Solar-Des Moines, reports that "with Man-Au-Trol, Model 75, it is possible to do a multitude of machining operations formerly requiring numerous expensive machines which had to be set up for a particular operation, so limited in scope, that an engineering design change either obsoleted the tooling or the machine. With Man-Au-Trol, Model 75, because of its wide range of functions, this obsolescence is greatly reduced — if there is a design change, only a new set-up is made — not the purchase of a new multi-thousand dollar piece of machinery."

These same advantages can be applied to your manufacturing methods —

Ask your Bullard Sales Engineer for complete details.



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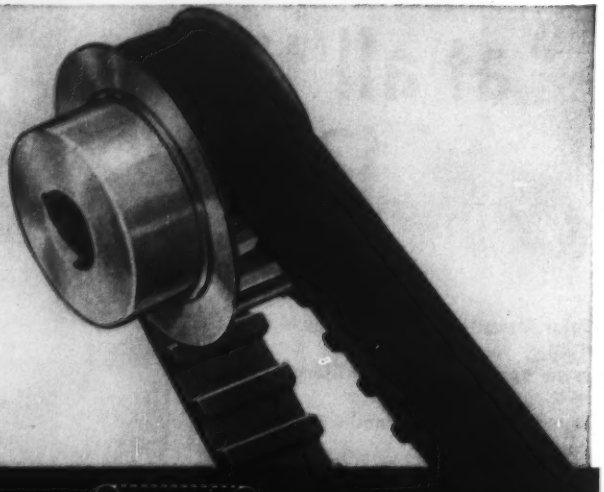
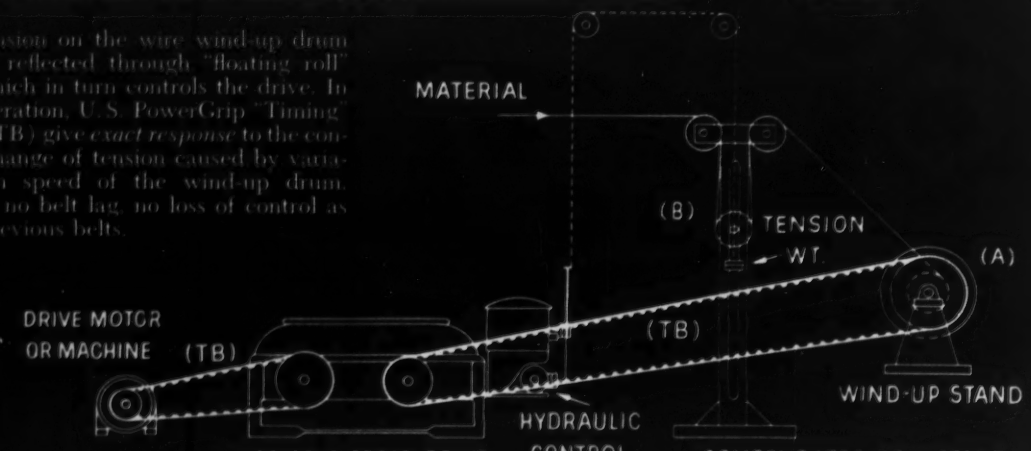
How a designer licked the wind-up problem in a highly sensitive machine



The tension on the wire wind-up drum (A) is reflected through "floating roll" (B) which in turn controls the drive. In this operation, U.S. PowerGrip "Timing" Belts (TB) give *exact response* to the constant change of tension caused by variations in speed of the wind-up drum. Hence, no belt lag, no loss of control as with previous belts.



The schematic drawing illustrates a "floating roll," one of the most sensitive and precise methods of controlling tension in a web of material—whether it be wire, paper, cotton, threads, plastic or strips of metal. It is one more example of U.S. PowerGrip "Timing"® Belt's ability to simplify and improve a power transmission unit . . . one of the reasons why the invention of this belt was recently awarded the Franklin Institute's Edward Longstreth Medal for "Invention of High Order."

Whether for original equipment or plant conversion, U.S. PowerGrip offers all these advantages:

- *no slippage, no take-up—allows short centers, high ratios.*
- *absence of metal-to-metal contact—eliminates need for lubrication and housing devices.*
- *handles speeds up to 16,000 F.P.M. or so slow as to be imperceptible to the eye.*
- *close to 100% efficiency.*
- *imbedded with steel cables for high tensile strength.*
- *constant angular velocity.*

These belts—plus expert engineering service—are obtainable at "U.S." power transmission distributors, at any of the 28 "U.S." District Offices, or by writing us at Rockefeller Center, New York 20, N. Y.

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US RUBBER **Mechanical Goods Division**

United States Rubber

Steelmaking Comments

Raw Material Preparation

By M. W. LIGHTNER
Vice President—Applied Research
Research & Technology Division
U. S. Steel Corp.
Pittsburgh

MUCH of the experimentation and pilot-plant work on the concentration of the extensive Lake Superior district magnetic taconites have been completed. Production is accelerating rapidly.

Indications are that the concentrates will be agglomerated into pellets, although not all major producers have committed themselves. There is a possibility that part of the concentrates may be used as sinter or nodules.

Both the traveling grate and the shaft-type pellet baking units will be used, and only experience will determine which will produce the best quality at lowest cost.

Ore Burden—Within a few years, the blast furnace ore burden, whether it is prepared from taconite, jasper concentrates or washed or direct shipping ores, will be agglomerated in a form more suitable for efficient reduction.

The benefits in increased furnace output and decreased coke consumption that result from increasing the percentage of ore sinter in the burden have been demonstrated. Work with pilot blast furnaces indicates that screened taconite sinter is practically the equivalent of screened pellets. It will be interesting to see if this is confirmed on commercial furnaces.

The next few years will see the construction of many new sintering machines, with particular attention to design features for greater throughput for a given hearth area and improved product quality.

Equipment — Increased use of prepared agglomerates may focus attention on design of blast furnace stoves and auxiliary equipment capable of producing higher blast temperatures.

Domestic sources of satisfactory open hearth charge and feed ores are extremely scarce. Methods for producing an agglomerate are being explored.

Available low-ash and low-sul-

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To *Purchasing* men who have helped make Joliet "first" we are proud to announce the completion of a very extensive plant expansion program. New facilities provide the reserve capacity and flexibility to meet any increase in both your regular or any emergency *immediate shipment* requirements. Continue to look to Joliet for washers of all types—standard and special, any size, any metal, any quantity.

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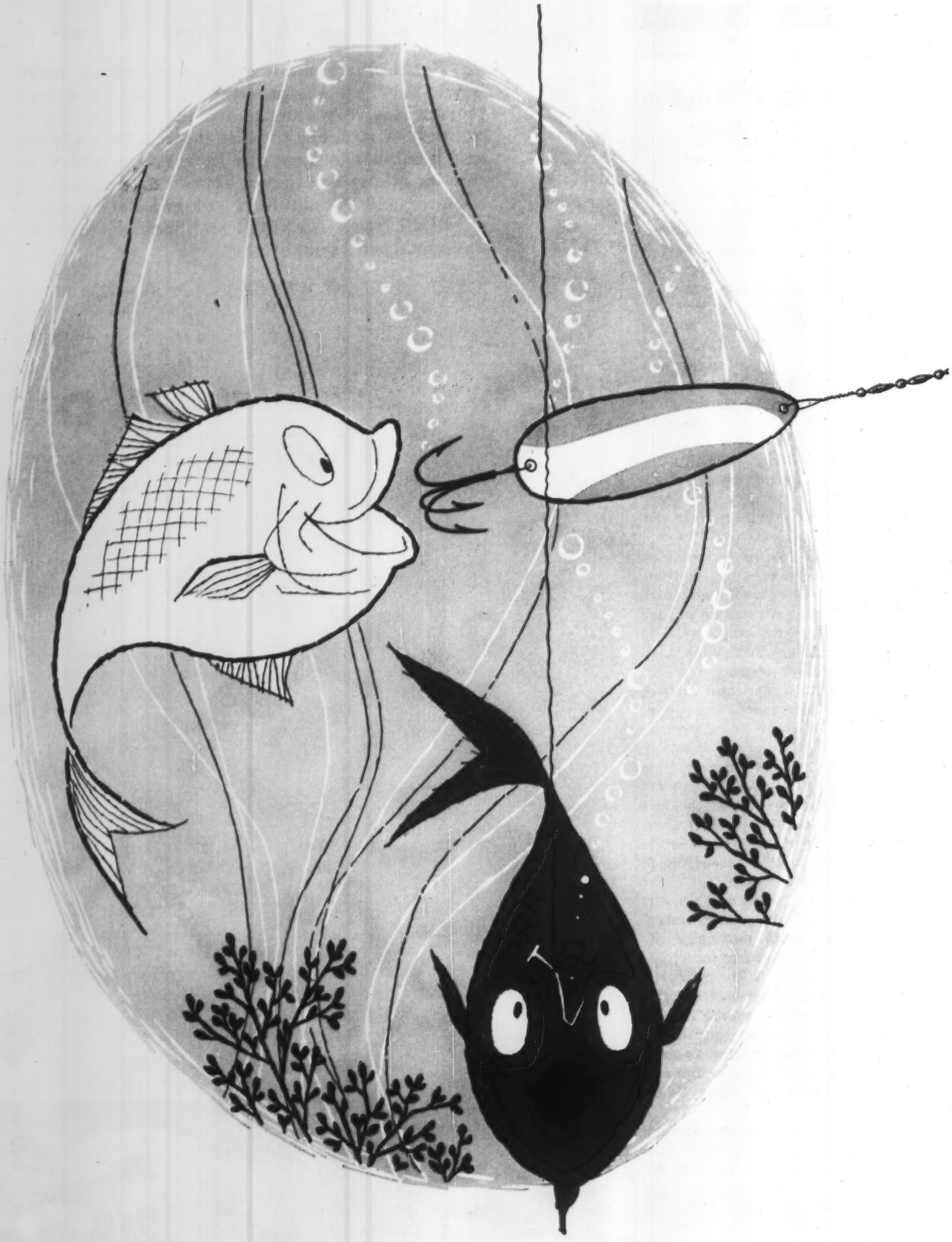

wires that fish

In addition to wire for the traditional bent pins, CF&I-Wickwire makes a wire that's a real pro at fish catching. It's the special spring steel wire used to make fish hooks. Heat treated so it's soft and ductile, this high carbon steel wire can be severely deformed by fish hook makers, then heat treated again to give the finished hook a spring-like quality and hardness.

Chances are you don't need wire to make either pins or fish hooks. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

Check This List!

FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

FLAT AND SHAPED WIRES
Armor Wire
Bobby Pin Wire
Bookbinder Wire
Brush Wire
Casing Wire
Cotter Pin Wire
Curtain Spring Wire
Die Spring Wire
Gutter Broom Wire
Lock Spring Steel
Rake Tine Steel
Regulator Spring Wire
Snake Fishing Steel
Stapling Wire for Preformed Staples (Flat)

LOW CARBON FINE AND SPECIALTY WIRE
Bee Wire
Bonnet Wire
Bookbinder Wire
Broom Wire
Clip Wire
Dent Spacer Wire
Drapery Pin Wire
Florist Wire
Fuse Wire
Glass Netting Wire
Hairpin Wire
Hook and Eye Wire
Mattress Wire
Picture Cord Wire
Picker Tooth Wire
Pin Ticket Wire
Pin Wire
Ring Traveller Wire
Spiral Binding Wire
Stapling Wire
Stapling Wire for Preformed Staples
Stone Wire
Weaving Wire
Weaving Wire for Fly Screen Cloth
Wissco Iron Wire

HIGH CARBON FINE AND SPECIALTY WIRE
Aircraft Cord Wire
Armor Wire
Belt Hook Wire
Bobbin Ring Wire
Brush Wire (Tempered and Untempered)
Brush Wire (High Strain)
Chrome Vanadium Spring Wire
Core Wire (Aluminum Cable Steel Reinforced)
Curtain Spring Wire
Flexible Shaft Wire
"Gamma" Spring Wire (Upholstery Spring Wire)
Zig Zag Wire
No-Sag Wire
Hat Wire
Heddle Wire
Hose Reinforcement Wire
Hose Wire, Mechanical
Hose Wire, Vacuum and Defroster
Rope Wire
Signal Corps Wire
Spoke Wire
Hard Drawn Spring Wire
Oil Tempered Wire
Spheroidized or Annealed Spring Wire
Tire Bead Wire
Valve Spring Wire

MANUFACTURERS LOW CARBON COARSE WIRE
Bag Tie Wire
Basket Handle Wire
Box Binding Wire
Brush Handle Wire
"Cal-Tie" Wire
Can Key Wire
Case Hardened Ball Wire
Chain Wire
Clamp Wire
Clothes Pin Wire
Concrete Wall Reinforcement Wire
Garment Hanger Wire
Hay Baling Wire (Coiled)
Lingo Wire
Lintel Wire
Loop Wire
Merchant Quality Wire
Pail Bail Wire
Rivet Wire
Stapling Wire
Strand Wire
Tying Wire
Welding Wire
Wissco Iron Wire
Industrial Quality Wire
Cold Rolling Quality Wire
Heading, Forging or Roll Threading Quality Wire
Medium High Carbon Wire

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Oklahoma City • Phoenix Pueblo • Salt Lake City • Wichita • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland San Francisco • Seattle • Spokane • WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo Chicago • Detroit • New Orleans • New York • Philadelphia • CF&I OFFICE IN CANADA: Toronto CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg

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KEYED TO PRODUCTION!

SILENT HOIST LIFTRUK

3-5-6-7½-8
10-12-15
Ton Capacities
FLUID DRIVE
POWER STEERING

"72 frames per load . . . three lifts every four minutes . . . proves our needs for additional LIFTRUKS"

The SILENT HOIST Heavy-Duty Fork LIFTRUK so rapidly stepped up the production and movement of material, over past handling methods, that this Plant Manager (quoted above), was equally quick to anticipate *fleet* LIFTRUK operations in their plant. *Another example that LIFTRUK pays its way!*

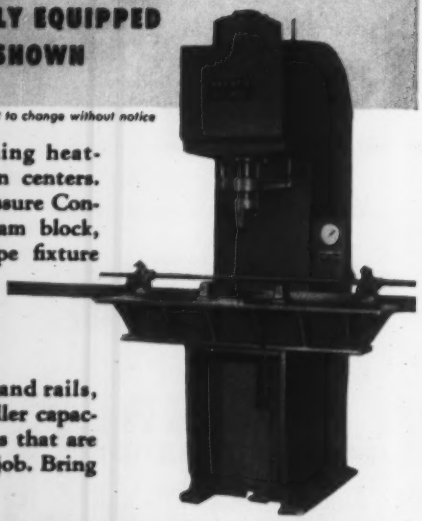
Can we aid in solving your problems? Send for Bulletin #77.

SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials-Handling Equipment
849 63rd Street, Brooklyn 20, N. Y.

This 25-TON Hannifin Straightening Press Sells For

$4,133 FULLY EQUIPPED AS SHOWN

Price F.O.B. our press plant at St. Marys, Ohio, subject to change without notice



The ideal press for straightening heat-treated parts up to 60" between centers. Exclusive Hannifin Sensitive Pressure Control for speed and accuracy. Ram block, two table blocks and center-type fixture complete with rails included.

STRAIGHTENING PRESSES FROM 5 TO 150 TONS

Hannifin offers longer tables and rails, roller-type fixtures, larger or smaller capacities (5 to 150 tons)—all at prices that are easily justified by savings on the job. Bring us your straightening problems.

HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

phur coking coals are being exhausted and washing equipment is being installed rapidly for all coals intended for metallugical coke. Equipment for careful coal blending control and adequate pulverization will be used generally to improve the strength of marginal coking coals.

Automatic Controls

By W. E. MILLER
Manager, Steel Mill Engineering
Systems Application Engineering Section
General Electric Co.
Schenectady, N. Y.

PRODUCTION and quality are becoming closely keyed to the performance of the process electric drive system.

On an automated drive system, the electric control maintains product quality within preset and usually adjustable tolerances and also well within limits of drive co-ordination.

Limited Range—On most steel industry processes, automatic control will not replace an operator. To avoid undue complication, most of today's systems are built with limited range. Limits of automatic control are indicated to the operator by signal lights, and he must make manual adjustments to restore the process within the range of automatic control.

The steel industry is demanding more production from each new rolling mill and processing line. If the mill does more work, it requires larger main drive and auxiliary drive horsepower. A more complicated control system is required to "harness" the greater horsepower and obtain the greater production available from the larger motors.

Design—System design requires a thorough knowledge of the process, principles of feedback control and available system components. It requires familiarity with and use of analog and digital computers. There are many possible system arrangements. There are innumerable possible adjustments of multiple feedback circuits.

Design variations can either be shaken out on the job or by engineering analyses on computers.

Large expensive rolling mill sys-

You can't beat this band!

Interested in faster cuts? smoother finish? less over-heating and breakage? The Atkins Curled-Chip Buttress Tooth band saw gives you all that and more! You get clean cuts—faster and smoother cuts . . . the "curled chips" roll easily out of the gullet—no jamming.

See your Atkins distributor today . . . increase production tomorrow . . . with Atkins!

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SAW DIVISION
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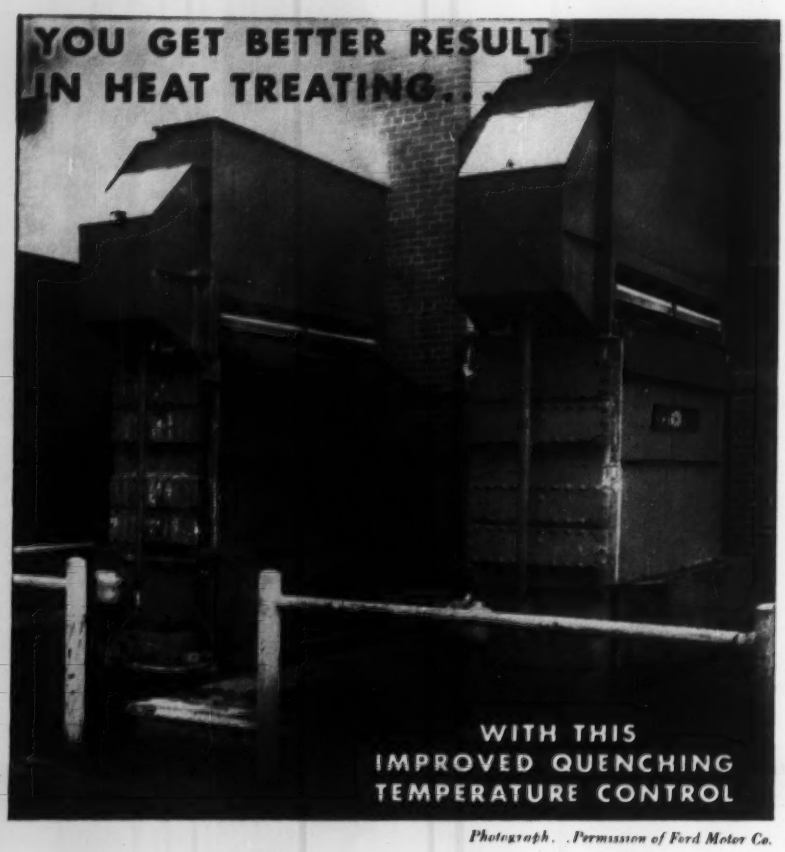

Photograph . Permission of Ford Motor Co.

● Use the **NIAGARA AERO HEAT EXCHANGER** to control the temperature of your quench bath and you remove the heat at its rate of input, always quenching at the exact temperature that will give your product the best physical properties. You get uniform results throughout the day's production, prevent losses, avoid rejections, increase your heat treating capacity.

The Niagara Aero Heat Exchanger transfers the heat to atmospheric air by evaporative cooling. It extends your quenching capacity without using extra water. It pays for itself with water savings.

In the installation illustrated the quench is caustic soda. Water also is accurately cooled and the system is easily kept clean. With an oil quench an extra advantage is to prevent flash fires.

You can cool and hold accurately the temperature of all fluids, air, gases, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. With the Niagara Aero Heat Exchanger you have closed system cooling, free from dirt and scale.

For further information write for Bulletin No. 120

NIAGARA BLOWER COMPANY

Dept. S, 405 Lexington Ave. New York 17, N.Y.

District Engineers in Principal Cities of United States and Canada

tems are too complex to determine optimum design by pure mathematical analysis. And during start up, it is not possible to know when the system has been adjusted for best performance without having previously made a computer study and having the results available.

Future—The coming years will see many installations of automatic gage control, punched card program control, numerical data processing and numerical control systems. Processes will progress from mechanization to automation.

Processes may be automatically programmed progressively from results of previous processes. As experience is gained, more processes will be tied together to reduce inventory and materials in process.

Oxygen Steelmaking

By C. R. AUSTIN

Manager
Steel Plants Division
Kaiser Engineers
Oakland, Calif.

STEELMAKERS here and abroad are finding that the cheapest way to increase ingot capacity is to install oxygen converters. Customer satisfaction with this steel has also contributed to rapid expansion of the process.

Plants using this technique have been in commercial production for two to four years—at McLouth Steel Corp., Trenton, Mich.; Dominion Foundry & Steel, Hamilton, Ont., and at Donawitz and Linz, Austria. Kaiser Engineers is designing and building plants for Jones & Laughlin at Aliquippa, Pa., and for Kaiser Steel at Fontana, Calif.

Other plants are going in at Bochumer Verein A.G. and Gusstahlwerk Witten A.G., Germany; at Ijmuiden, Netherlands; at Rourkela, India; and at Yawata and Kawaski, Japan.

Advantages—Features that have been attractive to steelmakers are: Low installation and operating costs, low nitrogen steels, assurance of steady delivery of steel to the rolling mills and good performance of the steel in rolling mills and in customers' plants.

In less than four years, the production of oxygen converter steel has grown from the negligible

if your product is

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ENAMELED
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here's how

WEIRZIN

electrolytic zinc-coated steel

seals it against rust and corrosion

Decorative color finishes adhere to Weirzin Electrolytic Zinc Coated Steel as though they were part of it.

The secret is in Weirzin's ductile zinc coating, which is bonded to the steel so tightly that it remains intact even under the most severe conditions such as high heat or humidity, deep drawing, stamping or forming. Result: no underfilm rust or corrosion.

Thus paint, enamel, lacquer or ink surfaces cannot be attacked from underneath; hence they cannot crack, chip or flake. No wonder Weirzin products look better, last longer, sell faster!

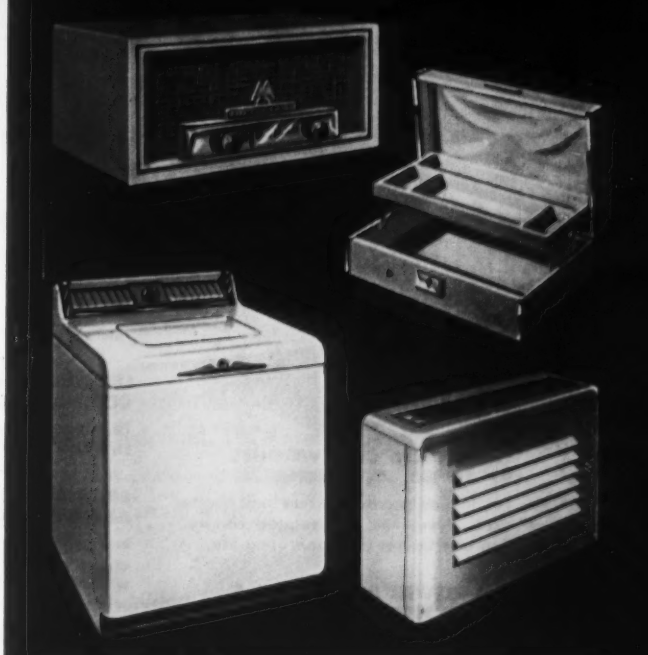
Weirzin is available with or without chemical treatment in coils or cut lengths, in all regular widths and gauges. If you would like specific information on the many ways in which Weirzin may benefit your product, please fill in and mail coupon (right) today.

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

NATIONAL STEEL CORPORATION



WEIRTON STEEL CO., Weirton, West Virginia

I would like to know more about Weirzin.

My product is _____

NAME _____

POSITION _____

COMPANY _____

ADDRESS _____

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COMMENTS

category to 1.7 million tons annually. By 1957, capacity in the U. S. and Canada will reach 2.5 million tons a year.

Investment—Plants in operation or under construction here and in Europe currently represent an investment of over $50 million. The installation designed by Kaiser Engineers is capable of adding ingot capacity at a cost of $15 per annual ton in plants of ¾-million-ton capacity.

Until now the process has been recommended mainly for steels which are below 0.35 per cent carbon. However, many high carbon grades have been successfully made in Austria. In time, the higher carbon steels and possibly low alloy steels will be made commercially in the converter.

Refractories—The extreme temperature in the refining zone of an oxygen converter makes the refractory used highly important. The Voest steel plant at Linz, Austria, manufactures its own oxygen converter refractories. The brick plant produces tar-burned dolomite brick by pressing. The unfired brick are fired in place in the converter. Average life is 240 heats per lining.

The Alpine-Montan plant at Donawitz, Austria, uses the same type brick but buys them from a commercial producer of general steel mill refractories.

Magnesite — McLouth Steel Corp., Trenton, Mich., started operation with commercial magnesite brick, and in the main, has continued this practice.

Tar-magnesite linings instead of tar-dolomite are receiving the attention of at least one brick manufacturer. Rammed monolithic linings of tar dolomite and/or tar-burned magnesite are other fields that will be explored in the future. Magnesite-chrome refractories for this service will receive further attention.

Trends in Annealing

By J. L. WHITTEN
Vice President
Lee Wilson Engineering Co. Inc.
Cleveland

LARGE steel companies are recognizing the advantages of the single stack furnace for the entire annealing department.

One large steel producer with 12 of these units has installed 12 more. Another producer, after trying out single stack equipment with two furnaces, has added 22 furnaces to the project and has ordered 14 single stack furnaces for a new rolling mill project.

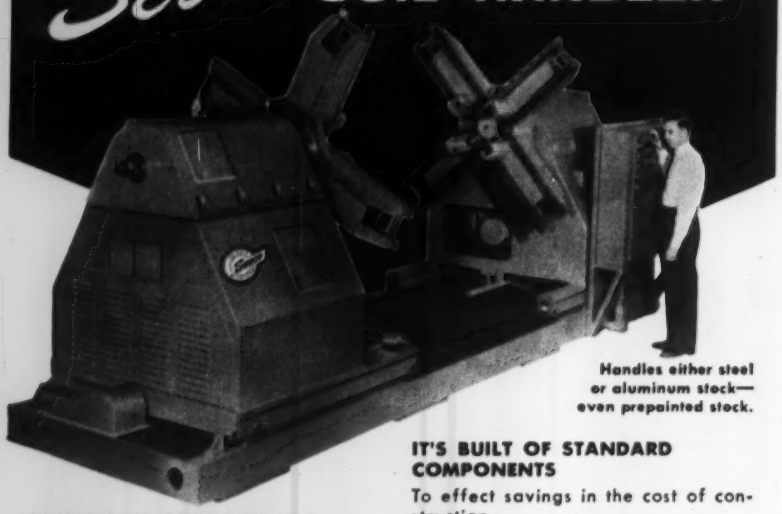
This trend is being followed by others. Even in plants which have not worked with pilot installations, complete single stack installations are being selected. A plant which makes tin plate has committed itself for 20 furnaces with 60 bases.

Advantages — With this equipment, and a complete set of temperature controls for each furnace, every charge becomes a special one and customer service (quality and quick turnover) is improved.

These installations require less floor space than others, and the smaller in-process inventory significantly reduces the capital investment in the annealing department.

Studies have been made on coil

Sesco "TWIN-IN-ACTION" COIL HANDLER



Handles either steel or aluminum stock—even prepainted stock.

IT HANDLES COIL WEIGHTS UP TO 40,000 POUNDS.
For longer production runs and shorter press down-time. The rugged construction also insures long operating life.

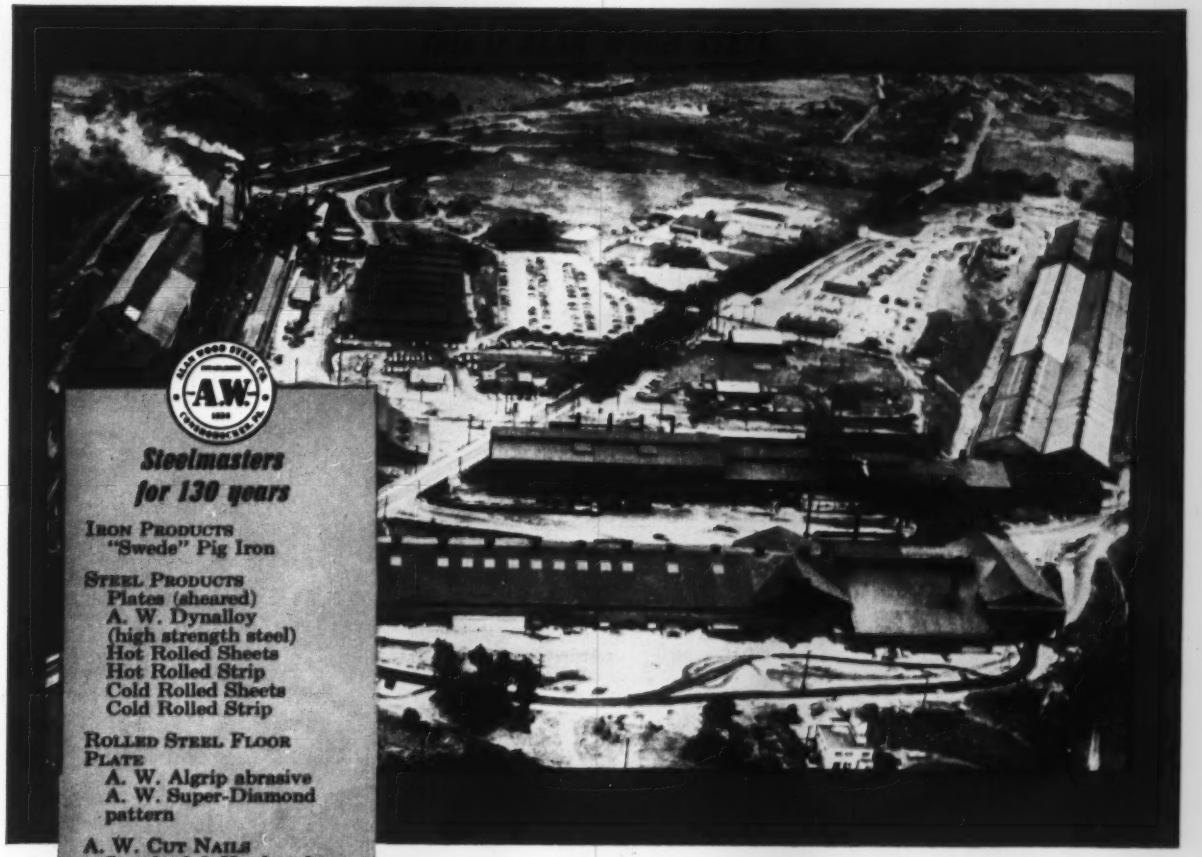
IT'S POWER DRIVEN—AT A CONTROLLED RATE.
To eliminate jerking and over-running. And, the reels are synchronized to carry the load equally. Furthermore, the expander arms are operated in unison, by positive power.

IT'S BUILT OF STANDARD COMPONENTS
To effect savings in the cost of construction.

EACH REEL CAN BE ADJUSTED LATERALLY.
Independently, or in unison, making it easier to establish a perfect alignment with the press, or the die.

ALL CONTROLS ARE GROUPED FOR 1-MAN OPERATION.
You merely press a button to uncoil the stock. Pay off is controlled by an electrically operated loop control.

Sesco INC. 8881 Central Detroit 4, Mich.
engineers & manufacturers of machine tools and press room equipment



Steelmasters for 130 years

IRON PRODUCTS
"Swede" Pig Iron

STEEL PRODUCTS
Plates (sheared)
A. W. Dynalloy (high strength steel)
Hot Rolled Sheets
Hot Rolled Strip
Cold Rolled Sheets
Cold Rolled Strip

ROLLED STEEL FLOOR PLATE
A. W. Algrip abrasive
A. W. Super-Diamond pattern

A. W. CUT NAILS
Standard & Hardened

MINE PRODUCTS
Iron Ore Concentrates
Iron Powder
Crushed Stone
Grit
Sand & Engine Sand

COKE
Foundry, Industrial & Metallurgical

COAL CHEMICALS
Ammonium Sulphate
Benzol
Toluol
Xylol
Naphthalene
Sodium Phenolate
Tar Bases (Pyridene)
Solvent Naphtha
Crude Still Residue

PENCO METAL PRODUCTS DIVISION
Steel Cabinets
Lockers & Shelving

INTEGRATION...

Alan Wood's integration means positive quality control from the selection of the ores to product delivery. Ores from our own mines at Dover and Oxford, New Jersey—iron from our blast furnace at Swedeland, Pa.—steel from our open hearth and mills at Ivy Rock, Pa.—constantly inspected by our laboratories, ensures compliance with customer requirements.

For detailed information on Alan Wood and its products, write Marketing Division—Department AW-51.

ALAN WOOD STEEL COMPANY

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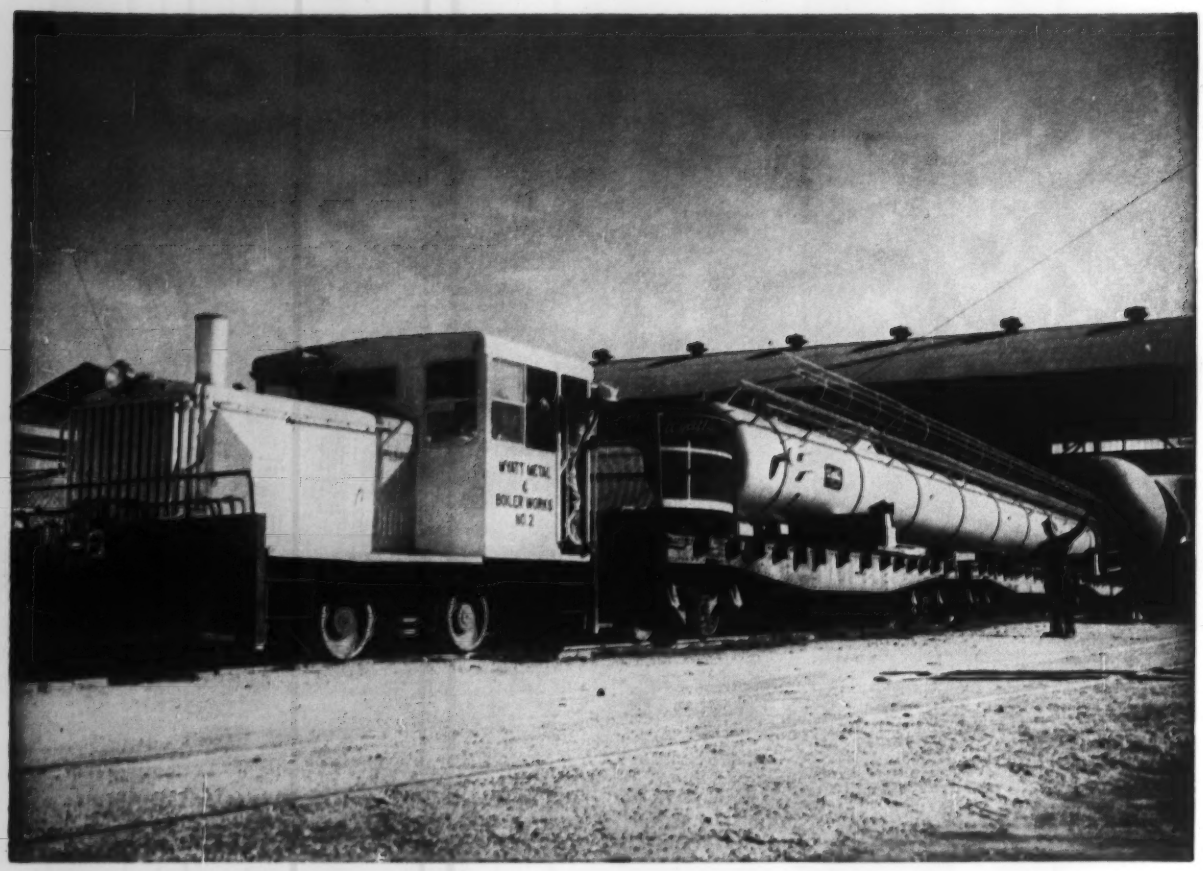


No down time in 16 months!

That's the record of this 20-ton Plymouth Diesel owned by Wyatt Metal & Boiler Works, Houston, Texas

This modern Plymouth operates approximately 45 hours a week, hauling, switching and spotting railroad cars in the plant. The operator praises the Plymouth Torqomotive* Drive because it eliminates shifting gears under heavy loads, assures smooth, steady power for peak efficiency, and reduces rough starts and coupling shocks.

"There just isn't anything we have found wrong with our Plymouth," says E. C. Jones, Vice President of Wyatt. "Efficiency in switching has doubled, and we have lost no time due to repairs or maintenance since we purchased the locomotive 16 months ago. It is far above anything we have had experience with."

If you are not enjoying the benefits of "Industry's Smoothest Switchers" write for illustrated catalog of the Plymouth line—models from 3 to 70 ton. Gasoline or Diesel, Mechanical or Torqomotive Drive. Also Diesel-Electric. PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-1, Plymouth, Ohio.

*TORQOMOTIVE DRIVE: PLYMOUTH TRANSMISSION COUPLED TO A HYDRAULIC TORQUE CONVERTER

PLYMOUTH® TORQOMOTIVES

(Advertisement)

CONFIDENTIAL

PLANT LOCATION FACTS

on financial assistance the free enterprise way

Financing a new plant today is a problem for any business, large or small.

In New York State, many banks, insurance companies and investment houses are willing individually to help you in making arrangements to finance new operations or build new plants. In addition, by special charter of the State Legislature, there has been established in the State of New York the New York Business Development Corporation. This organization is privately financed and managed and specifically designed to assist qualified enterprises in financing new or expanded operations in the State.

If you have a financing problem, our business is to put you in touch with the proper sources of capital. Therefore, whether you need mortgage money to help finance your new plant in New York State or working capital to cover expanded operations or to offset expenditures for moving into the State, do not hesitate to get in touch with us.

Financing won't be your only consideration in deciding on a new plant. You will want complete facts on labor, markets, water, available sites or buildings, power, fuel, transportation and raw materials, to mention just a few. And you will want information on these as they apply to the successful operation of a specific plant.

A tailor-made report

Any or all of the factors important to your analysis will be covered in a confidential report to you—tailored to your needs. It will be prepared by a professional and experienced staff to cover either New York State locations of your choice, or, if you wish, sites which we will select on the basis of your needs.

Our booklet, "Industrial Location Services," explains what we can do for you. To get your free copy, write me at the New York State Department of Commerce, Room 670, 112 State Street, Albany 7, New York.

EDWARD T. DICKINSON
COMMISSIONER OF COMMERCE

COMMENTS

handling, crane service, maintenance and first cost on installations as large as 100,000 tons a month. Results: No apparent disadvantages. Tremendous advantages in quality and special service.

High Top Pressure

By BRUCE S. OLD
Arthur D. Little Inc.
Cambridge, Mass.

HIGH TOP pressure operation of blast furnaces is generally accepted. Some 30 blast furnaces at seven steel companies in this country are operating converted furnaces.

Reports indicate a gain of 5 to 20 per cent on iron production, a 20 to 50 per cent decrease in flue dust and a slightly lower coke rate. England, with three furnaces, and Russia, with perhaps 15, report similar gains.

The big news in high top pressure is the reported Soviet pioneering plan for construction of a 5000 ton a day furnace that has a 32 ft hearth, a 175,000 cfm blower rated at 3.5 atmospheres (gage) and operates at a top pressure of 25 psi.

Continuous Casting

By NORMAN P. GOSS
Consultant
Cleveland

ALL the pertinent problems connected with the continuous casting of metals have been solved: Perfection is the next step. Excellent pouring techniques have been developed, making it possible to precisely control the flow of metal at 50 lb per minute and up.

Mold distortion is no longer a major problem; neither are the mechanical problems associated with cutting the moving slab or billet.

Mold friction is more controllable. The thin skin which forms the instant the molten metal contacts the mold surface is weak for the first few seconds. The tensile strength of the bar at this stage may be only a few hundred pounds. For this reason, only minute frictional forces may be tolerated.

Aluminum — This problem has been solved in the casting of aluminum and its alloys. A method

SINCE 1941, TMI has concentrated all its facilities on quality rather than tonnage. TMI's pioneering, Research and Improved Methods are the tried-and-true servants of America's prime users of precision tubing.

The Mark of Quality TMI

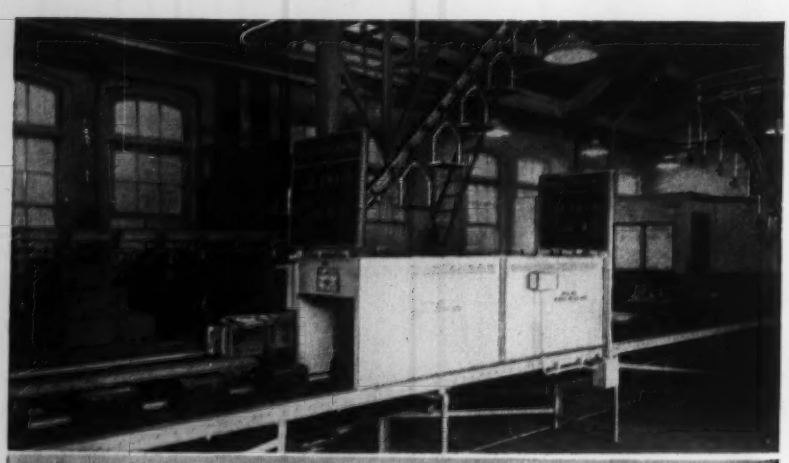
Loyalty To Our Customers

IS ONE OF THE MOST IMPORTANT ELEMENTS IN TMI Tubing

By teaming quality thinking with quality production we breed a rare industrial brand of loyalty . . . a priceless element in every foot of TMI stainless steel and special alloy tubing. This is especially true when new design ventures into uncharted realms requiring the ultimate in performance: multiple shapes I.D. and O.D., tolerances to .001" and closer, quality that defies the x-ray . . . extreme heat and chemical attack.

TMI specializes in small diameters, .040" to .625" O.D. . . . and in solving your tubing problems. Inquiries are welcome and receive immediate cooperative attention.

TUBE METHODS INC. METALLURGISTS ENGINEERS • MANUFACTURERS
BRIDGEPORT (Montgomery County), Pa.



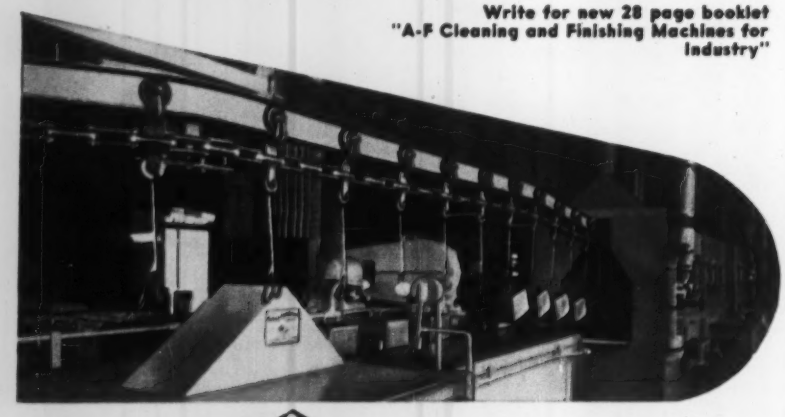
ANOTHER COMPLETELY CO-ORDINATED CONVEYING AND FINISHING SYSTEM...
A-F Engineered and Manufactured

IN THIS LARGE plant, the two illustrations picture an A-F Conveyorized infra-red stencil drying unit and an A-F Overhead Trolley Conveyor carrying filled, hermetically sealed containers through a cleaning and drying unit. In all, *thirteen different operations* are performed, including test for leaks, two washes, two rinses, drying, surface treatments, paint dippings, stenciling and infra-red drying. From unloading platform to storage and shipping, the work flows quickly, efficiently, economically!

WITH TWO correlated departments for designing, engineering and manufacturing conveying systems and metal products cleaning and finishing machines, we are unique in being able to offer you a completely co-ordinated and conveyorized cleaning and finishing system based on 55 years of experience in effecting operational savings.

There is no substitute for this experience. It can help you in many ways. Before you order a cleaning machine or conveyor—write us for an estimate. In many cases we will be low—but in *any* case your A-F *Engineered* Equipment will be right for the job it is intended to perform.

Write for new 28 page booklet "A-F Cleaning and Finishing Machines for Industry"



A-F

YOU CAN SEE THE SUPERIORITY OF A-F CONVEYOR ENGINEERING

A-F *ENGINEERED* CONVEYING SYSTEMS

Also Pre-Engineered Conveyors—Wheel, Trolley
Rack Washers
Metal Cleaning and Processing Machines

THE ALVEY-FERGUSON CO., 573 Disney Street, CINCINNATI 9, OHIO and Azusa, Cal.

described in patent 2,747,244 provides a film of lubricant (oil) over the entire inner surface of the mold. Means are provided to automatically control the oil film during casting. The casting machine can be continuously operated for 8 hours.

Since the mold wall friction is far less than the tensile strength of the embryonic skin, high casting rates are possible. One-inch bars are cast at 10 to 18 ft per minute, depending upon the alloy. It is quite evident that the lubricant must be maintained or else the casting will hang up and pull apart.

Steel—In the casting of steel, mold wall friction is also a major problem. A continuous casting machine which will cope with mold friction and control pouring is under construction. The mold is made in sections to resist mold distortion, and can be dismantled rapidly when the chill surfaces require machining. (The mold surface develops scratches over long periods of operation.)

All-Basic Open Hearth

By R. P. HEUER
Vice President
General Refractories Co.
Philadelphia

THE all-basic furnace has made rapid technical progress within the last year. Suitable roof refractories, using a new type of unfired basic brick, are available. Good roof designs, using suspended construction, have been developed.

The properly handled all-basic open hearth furnace is capable of increasing production 10 to 25 per cent over that of silica roof furnaces. Fuel consumption does not exceed that of silica roofs, and, in favorable cases, may be as much as 10 per cent less. Refractory costs are equal to, or lower than, those of silica.

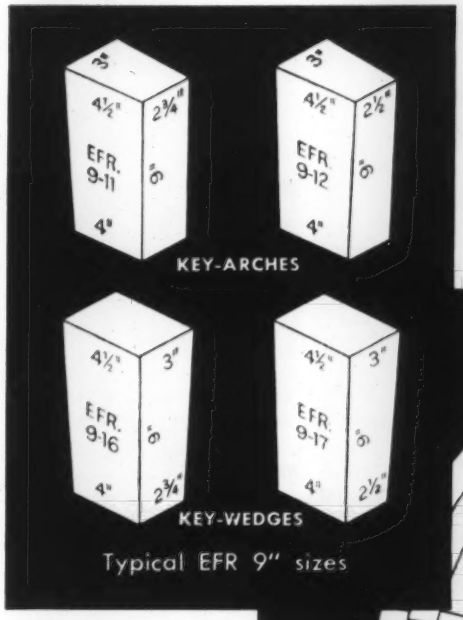
The net effect is a decrease in the furnace cost per ton of ingots. The increase in earnings, via increased productivity, is substantial.

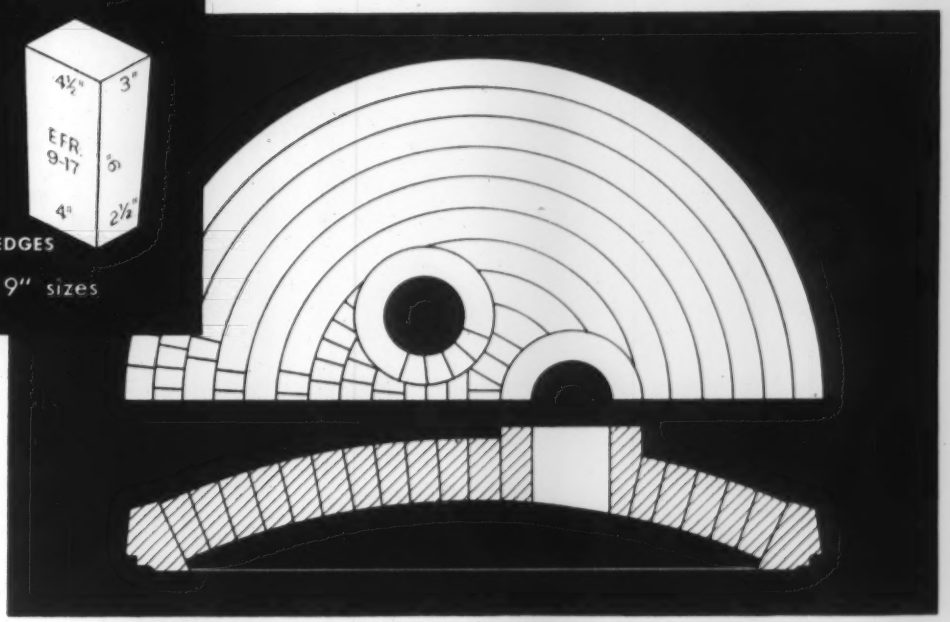
The all-basic furnace should pay for its greater initial or conversion cost within one campaign of six months to one year.

For electric furnace roofs

Harbison-Walker EFR design

provides important benefits





Harbison-Walker EFR (electric furnace roof) brick are modified 9" key-arches and key-wedges, designed for use in combination with a large proportion of standard 9 x 4½ x 3" sizes in the construction of roofs of any diameter and rise.

The use of these EFR shapes insures a close fit of the brick and roof construction of best workmanship.

The number of different sizes required for building a roof with the aid of the EFR brick is greatly reduced for some designs.

Bricklaying is simplified and much time is saved when EFR brick are used.

EFR brick are power pressed by which method of forming all of the most desirable physical properties are secured.

Roofs built of smaller brick units in preference to large special shapes generally prove to be more serviceable. The smaller sizes are more resistant to thermal shock.

The EFR shapes cost less than large special shapes and since they are used with standard 9" sizes in predominance, the overall cost is considerably reduced.

H-W High Alumina Castable and Korundal Ramming Mix sometimes are used to advantage as a monolith to facilitate easy fitting in the center section.

The EFR brick, together with the standard 9" sizes needed for complete roofs, are furnished in the types and classes of refractories best suited for the various operating conditions. For example, they are made in the following brands: STAR and VEGA silica brick; H-W MULLITE; KORUNDAL; and various Harbison-Walker superduty brands, such as ALAMO and H-W SUPER SAVAGE.

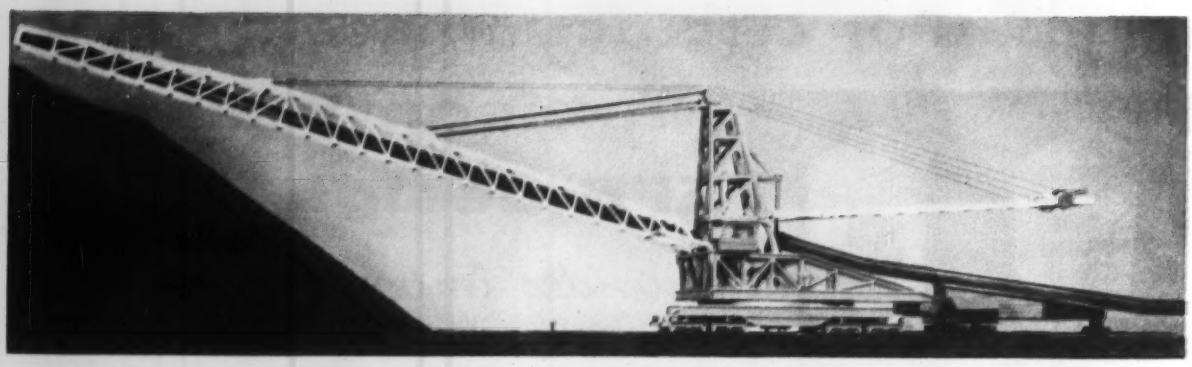
The combination of quality, H-W Technical Service and balanced selection based on availability of all types and classes of refractories from one source, provides maximum economy.

HARBISON-WALKER REFRACTORIES COMPANY

AND SUBSIDIARIES

World's Most Complete Refractories Service

GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA



Giant Stacker

A GIANT, self-propelled stacker, said to be the world's largest, is being erected at the Hoyt Lakes, Minn., plant of the Erie Mining Co. When completed, it will store the winter production of taconite pellets in piles 90 ft high, 800 ft wide and 1400 ft long. Each one will contain about 4 million tons.

Show — The illustration above shows a model of the stacker that will be displayed at the 1956 convention of the Iron & Steel Engineers, Cleveland, Sept. 25-28, and at the American Mining Congress' 1956 show at Los Angeles, Oct. 1-4. The boom covers an area 550 ft in diameter and is fed by a trailing conveyor 1400 ft long.

Link-Belt Co., Chicago, designed the machine and is installing it.

Training Device

INSPECTORS can get practical training in ultrasonics from an inexpensive flaw simulator. Developed and built by engineers at General Electric Co., Schenectady, N. Y., the device duplicates any number of defects found in large rotors.

It consists of a large, transparent plastic disc. The interior is hollow. Small pieces of metal can be placed anywhere inside on small holders. When the disc is filled with glycerine, the metal pieces show up on ultrasonic detectors exactly like flaws in steel shafts.

Glycerine used with smaller piezoelectric transducer crystals insures the geometric similarity between the trainer and a forged rotor. Transducer crystals can be 1 or 2¼-megacycle types.

from the hand of the specialist . . .
To Your Specifications

ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

Designers and engineers from every field of industry submit their exacting specifications to us for special fasteners to resist corrosion, extremes of temperature, tensile, fatigue, impact, and shear stresses. For more than 40 years our skilled craftsmen have met the requirements of construction and farm machinery, of transportation, refining and railroad equipment, the heavy machines of industry, pressure vessels, compressors, pumps, in widely diverse applications. We are prepared to serve you well. Send us your fastener specifications for prompt estimate.

A SUBSIDIARY OF BARIUM STEEL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives in Principal Cities

Simple hand assembly of five .209" formed components into a complete housing dramatically demonstrates the precision of stampings produced on By-Products' new press line. No additional finishing or machining is necessary before final fit-up.

Formed to FIT . . . as they come off the line!

OUR VERSATILE NEW PRESS LINE CAN CUT PRODUCTION STEPS FOR YOU!

■ With a new press line for deep drawing and mass producing light gage precision parts—like the units that make up the compressor housing pictured above—*plus* extensive facilities for producing heavy plate shapes, By-Products Steel Co.'s service is now even more flexible, more useful to you!

Today, By-Products can satisfy requirements for precision formed components all the way from sheet gages up into heavier plate thicknesses. Combined with the new press line, more than 150 machines offer you the most complete plate shaping service available.

We've made the investment in equipment and manpower! You pick up the benefits . . . in lower overhead . . . fewer production steps in your shop . . . reduced freight . . . virtually no scrap loss . . . lower production costs.

Get complete details. Write, outlining your interests, to Manager, Marketing Service, 832 Lukens Building, Coatesville, Pennsylvania.

■ **PRESS LINE UNITS**

1. Automatic Loader and Greaser
2. 900 Ton Press
3. Washing Machine
4. Annealing Furnace
5. 600 Ton Press
6. Trimming Press
7. 22 Ton Punching Press
8. 45 Ton Punching Press
9. 150 Ton Punching Press

Units are linked by reversible conveyors for fast, economical production.

BY-PRODUCTS STEEL CO. LUKENS

A DIVISION OF LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

SCHLOEMANN

FIRST
with largest extrusion press

proven performance

14,000 ton Extrusion Press

This Schloemann Press is now completing two years of successful operation. As a key unit of the U. S. Air Force Heavy Press Program, it produces light metal shapes up to 110 feet in length and up to 2500 pounds in weight. Substantial economies are made possible with this unit as well as greater flexibility of product design.

You are invited to discuss with us your extrusion press requirements for any industrial production.

Existing Equipment by SCHLOEMANN

Domestic users of equipment built by Schloemann are assured of competent service-engineering, supply of genuine spare, and repair parts. Call a Feller service engineer.

FELLER ENGINEERING COMPANY

Exclusive U.S. Agent

Miniature Roller Leveler Handles Thin Strip

Producers of alloy, stainless and silicon steels as well as nickel-iron magnetic materials can level strip in widths from 0.005 to 0.020 in. with this high precision unit.

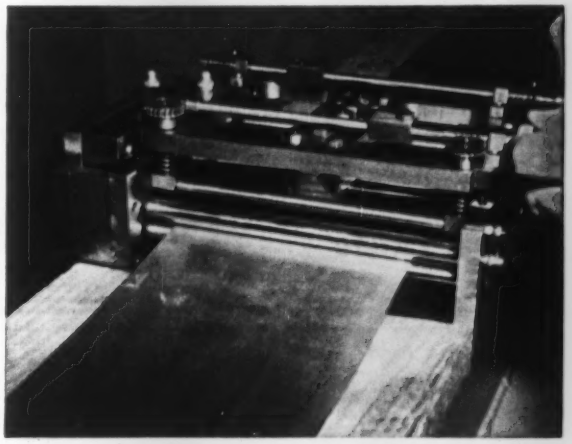
Model DRL-37508 uses backed-up work rolls. It has 13 leveling rolls (⅜-in. in diameter and 8 in. wide) and two pinch rolls (9/16-in. in diameter). All rolls are power driven.

Screwdown mechanisms at the front and rear of the machine are used to adjust the rolls.

The machine has a ¾-hp, four-speed gearshift drive and magnetic starter with remote control pushbutton station.

High strength steel roll frames and a fabricated steel base, which encloses the motor and drive, add to the ruggedness of the unit.

Another machine levels strip stock from 0.020 to 3/16-in. in width. These units will be on exhibit at the Iron & Steel Exposition, Cleveland, Sept. 25-28. With them will be a wire flattening mill that operates at speeds to 2500 fpm, a heavy duty slitter with recoiling equipment, and 2-high/4-high combination



rolling mills that are used as one-way or reversing units on hot or cold reductions down to 0.001 in. *Write*: Stanant Mfg. Co. Inc., 47-28 37th St., Long Island City 1, N. Y. *Phone*: Ravenswood 9-2420.

Powdered Metal Compacting Press Exerts 300 Tons of Force

The Model 300-H hydraulic press extends the range of sizes and shapes of powdered metal parts which can be compacted.

Fabricators can produce, without additional tooling, such shapes as a double counterbore and a double hub. A counterbore can be formed in each end of the part, and a hub can be produced on both sides of a flange.

Variations of the shapes are possible. A double-hub part can be made with both counterbored and through holes. Or a double-counterbored part can have an offset or flanged section on the outside.

The main pressing platen on this four-column press moves down from the top. Four auxiliary cylinders are mounted on the platen—two are connected to an inner top punch platen and two to an outer one.

Auxiliary cylinders can be adjusted to a maximum pressure of 125 tons. The main platen exerts a force of 300 tons.

The die platen, held in its top position by two air cylinders, uses 300-ton adjustable stops to limit its downward movement. The bottom, or ejector platen, is operated hydraulically with a maximum force of 300 tons.

Both floating and stationary core rods can be used. The floating core rod can travel with the part during ejection—until the part has cleared the die and expanded enough to release its hold. *Write*: Baldwin-Lima-Hamilton Corp., Hamilton, O. *Phone*: Hamilton 4-6511

NEW PRODUCTS and equipment

Sheet Classifier

A high speed, single sheet reclassifying system has been added to the AccuRay line of measuring equipment. It will be on display at the Iron & Steel Exposition, Cleveland, Sept. 25-28.

The system is designed to reclassify rejected sheets that have been graded according to thickness while in strip form. It measures the individual sheet, accepts or rejects it and prepares the way for the next one.

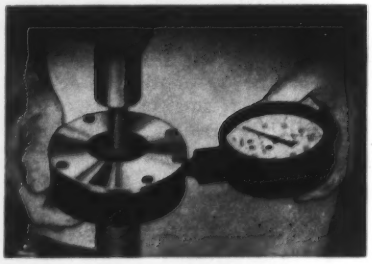
The measuring equipment is permanently calibrated to read directly in thousandths of an inch. Periodically, the system automatically checks itself.

The system consists of a measuring head, basic console and a high speed balancing servo and indicator. *Write*: Industrial Nucleonics Corp., 1205 Chesapeake Ave., Columbus 12, O. *Phone*: Hudson 8-0671

Force Gage

This direct reading unit measures the force between electrodes on spotwelding machines or between rolls on roll welders. It also makes compressive tests for forming, dimpling and upsetting operations.

The gages are 1¾-in. thick at the load point, and the body diameter is 4⅝-in.



Five gages measure from 0 up to 40,000 lb. The hydraulic type gages are accurate to 1 per cent and read directly in pounds. *Write*: Webster Instruments Inc., 11856 Mississippi Ave., Los Angeles 25, Calif. *Phone*: Granite 9-6770

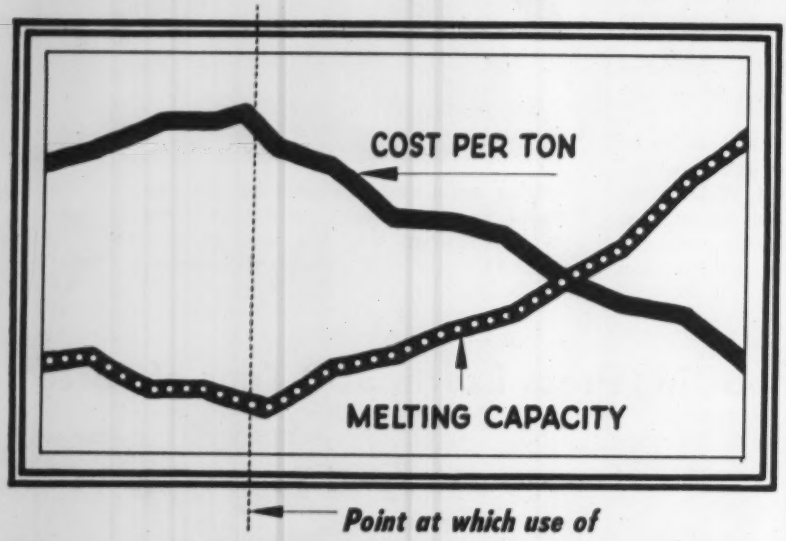
Drum Tilter

One man can empty a standard 55-gallon drum with this tilter. Loads up to 750 lb can be handled.

Once lowered over a drum, the tilter is ready to lift as soon as two load binders are tightened. When the drum is lifted, a light pull on a chain or a twist of a handwheel turns the drum so that its contents can be poured or dumped.

The tilter can be used with both

A Great Picture By GLOBE Ladle Brick



Point at which use of

GLOBE SUPERIOR LADLE BRICK

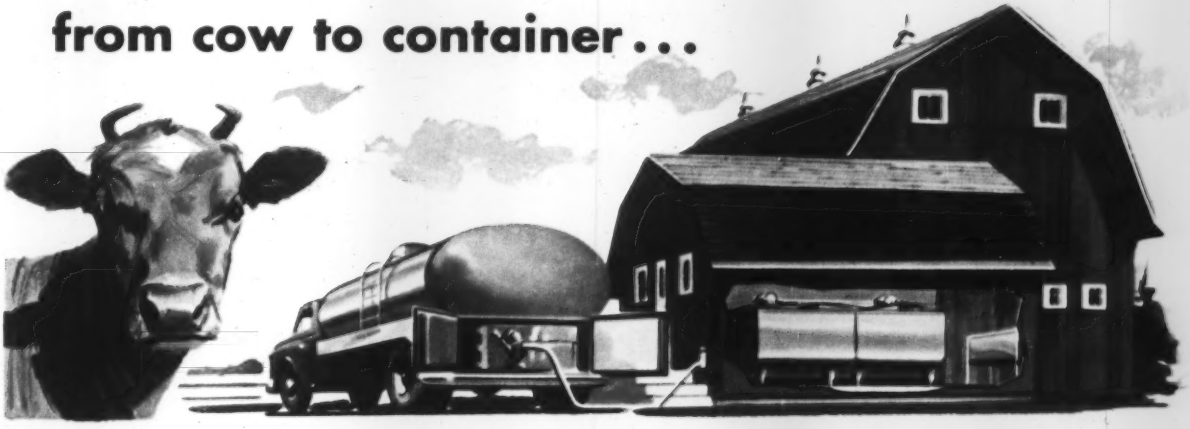
was introduced . . . . . .

When Globe superior ladle brick is specified, cost per ton goes down and melting capacity goes up. These happy conditions come about due to the fact that Globe ladle brick last longer on account of their greater resistance to Open Hearth slags. Globe superior ladle brick are well known in the Steel Industry. There is a type for every need of ladle lining. Our customers have learned to depend on both quality and service that the brick and our Company render.

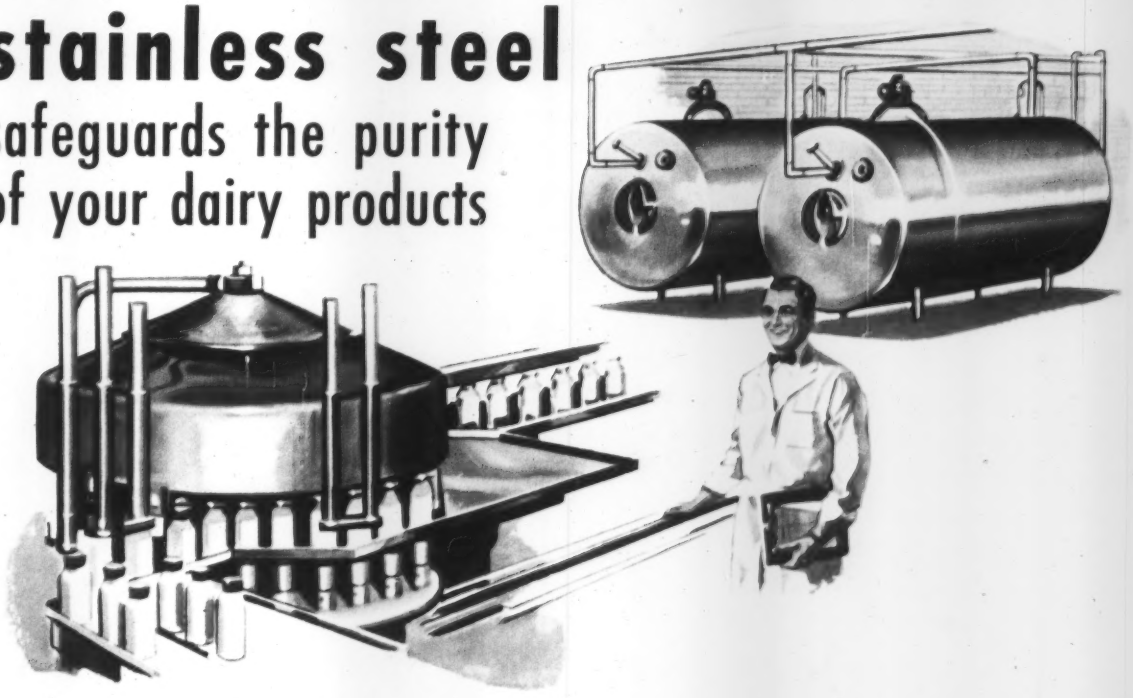
SERVING THE STEEL INDUSTRY SINCE 1873 ★

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO

from cow to container...



stainless steel
safeguards the purity of your dairy products



Dairymen and milk-product plant operators know that Stainless Steel is the only metal that year after year effectively resists acid corrosion. It can easily be kept clean and sterile and imparts no odor in contact with the product.

Through all the stages of milking, transportation, processing and packaging Stainless Steel completely safeguards the delicate flavor and highly sensitive qualities of milk and cream, and milk products like butter, cheese, ice cream and powdered milk.

The delicious taste of your dairy products and the assurance of their purity is due to the dairyman's extreme care and scientific methods and the use of Stainless Steel equipment.

McLOUTH STAINLESS STEEL

For the product you make today and the product you plan for tomorrow specify McLouth high quality sheet and strip Stainless Steel

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN • MANUFACTURERS OF STAINLESS AND CARBON STEELS

30 STEAM HAMMERS

can't shake Speedomax® H off control

In the heart of the Chicago steel area, Speedomax H 3-Action P.A.T. recording controllers are helping Standard Forgings Corp. turn out quality forgings which range in size from 5 lb. blanks to railroad axles weighing about ½ ton. Subjected to constant and severe vibration from 30 steam hammers and 60 presses for 24 hours a day, 5 days a week, 13 Speedomax H instruments (with five more waiting installation) have been controlling furnace temperatures for over a year with only such routine maintenance as chart changing, etc. And work temperature is held constant within ± 10 F. In both respects, this represents far better performance than the company has experienced before.

In addition to being assured of the correct temperature for each heat, Standard Forgings has also realized the following more tangible benefits since installing Speedomax H: (1) doubled refractory life, (2) reduction in scale with corresponding reduction in bottom cleaning from twice a week to once in two weeks, and (3) fuel savings of 50-75 gallons of oil per shift. Savings realized in increased furnace efficiency alone paid for the instrumentation in a short time.

Perhaps Speedomax H can help solve your temperature problems. For further information, contact your nearest L&N office or write 4957 Stenton Avenue, Philadelphia 44, Pa.

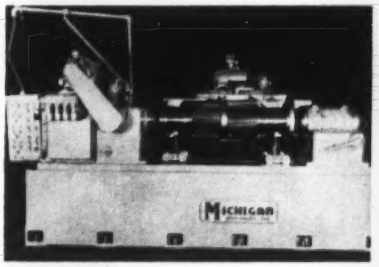
LEEDS Instruments LN NORTHRUP Automatic Controls • Furnaces

disposable and returnable drums. *Write*: Heppenstall Co., Pittsburgh, Pa. *Phone*: Mayflower 1-2000

Gear Shaver

Large pinions used by turbines in ships and power generating plants are finished by this machine. A gear can be shaved anywhere on a 100-in. shaft.

Depth of cut can be controlled down to tenths of thousandths of an inch.



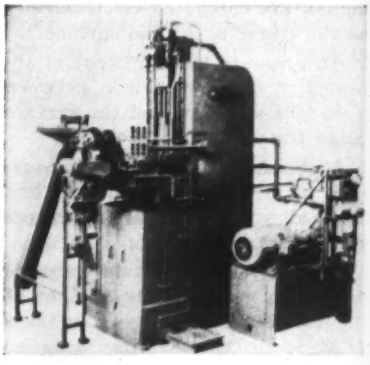
Thirty-two pushbuttons are provided on the pendant control box to govern spindle speeds, in-feed, cycle starting and stopping and traverse feeding.

Ten motors (1/3 to 5 hp) are used to perform machine functions. *Write*: Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

Broacher

This pull-down machine provides maximum tooling flexibility for vertical, internal broaching. All components are interlocked to provide continuous automatic operation.

The machine can be tooled with



To this little fellow building the 1956 "dream car", precision is a bent nail or a split board. To modern automotive engines and aircraft power plants, PRECISION is a most important element.

That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought fastener to meet your specifications. And remember, at Chandler . . . there is nothing special about PRECISION because we do it every day.

6842-CH

Write today for Bulletin 1264-CH

CHANDLER PRODUCTS CORPORATION

1488 CHARDON ROAD • CLEVELAND 17, OHIO

Why TECUMSEH Compressor Crankcases Are MICROHONED

"On Tecumseh compressors, we Microhone the piston bores. ***This gives us a running seal between pistons and bores which prevents gas leakage and eliminates the need for piston rings!*** Believe me, it takes a real combination of accuracy and functional surface finish to get results like that . . . and only Microhoning has given us that combination!"

(Tecumseh Products Company, Tecumseh, Michigan, is the world's largest producer of refrigeration compressors. Precision engineered and processed these units are hermetically sealed before leaving the factory.)

OTHER JOB DATA:

MATERIAL	Cast iron
PRECEDING OPERATION	Diamond finish-bore
MICROHONING OPERATIONS	One
STOCK REMOVAL	.0007" to .001"
FINISH	10 Microinches
TOLERANCES	
Diametric	.0003"
Roundness	.00015"
Straightness (Taper)	.00015"
HONING CYCLE	18 seconds, including fixture indexing time

"Here's our twin cylinder crankcase. The two piston bores in each case are opposite one another in the vertical plane, but they lie in two different horizontal planes. We simultaneously Microhone both bores in each crankcase, using a horizontal type machine with two opposing spindles."

"Although all of our crankcases are similar in design, the bores vary in diameter—1.312", 1.375", 1.500" and 1.625". Two fixtures on a two-position rotary indexing table let us Microhone one crankcase while another is being loaded. To run different bore diameters we just change the tools and gage rings. Switchover time is about five minutes."

Let a Micromatic Field Engineer show you how Microhoning will give you better functional finishes, closer tolerances and higher production.

☐ *Please have a Micromatic Field Engineer contact us.*

☐ *Please send literature and case histories on Microhoning.*

NAME_____

TITLE_____

COMPANY_____

CITY_____ ZONE____ STATE_____

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

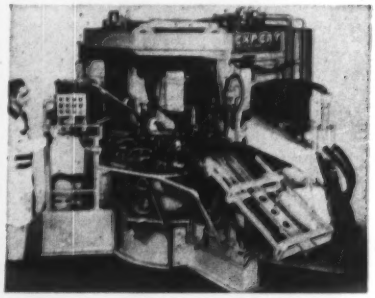
NEW PRODUCTS and equipment

radially locked pullers that are hydraulically actuated and electrically interlocked to the machine cycle. This assures that broaches are positively locked in the pullers before the machine cycle can continue. *Write*: American Broach & Machine Co., Ann Arbor, Mich. *Phone*: Normandy 2-5621

Projection Welder

This seven-station rotary index machine accurately positions and welds nuts or brackets to part surfaces.

A cam drive mechanism controls index and weld sequences. Weld nuts are delivered to the projection welding guns by a transfer unit.



The machine is 8 ft high and has a table which is 60 in. in diameter. Welding current is supplied by four 65-kva and two 100-kva transformers. *Write*: Expert Welding Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich. *Phone*: Twinbrook 1-4327

Surface Finish Tester

All standard surface finish designations can be measured with this testing and measuring instrument. Values, in microns or microinches, are computed electronically as the tracer scans the surface.

An absolute measurement is obtained, not a comparison between a surface standard and the surface being tested.

A standard tracer system measures plane or curved surfaces and internal and external diameters and tapers.

It takes 15 seconds to measure maximum peak-to-valley height of the roughness, average roughness (RMS), or the bearing area or

NEW PRODUCTS and equipment

bearing contact. *Write*: William J. Hacker & Co. Inc., 82 Beaver St., New York, N. Y. *Phone*: Bowling Green 9-8750

Magnetic Disc Brake

This unit is for electric motors that operate in atmospheres where combustible dust is a hazard to men and equipment. With it, design engineers and motor manufacturers can provide the safe, instant stop-start and holding advantages of magnetic disc brakes on motors in Class II, group E, F and G locations.

Maximum torque ratings are 10, 25, 50 and 75 ft-lb. *Write*: Stearns Electric Corp., 635 S. 28th St., Milwaukee, Wis. *Phone*: Evergreen 3-4800

Masking Tape

No. 728 is a pressure sensitive flatback tape that combines high tear resistance with thinness and high tensile strength.

The tape is used for sealing boxes when extra strength is need-

How MICROHONING Makes a Gas-Tight Running Seal Without Piston Rings

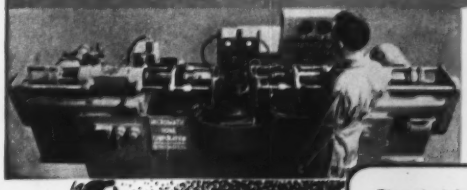
A leak-free, running seal between bores and pistons—without the use of rings—is possible only when the processing method generates diametric and geometric accuracy and the required functional surface finish. These characteristics are simultaneously obtained by the Microhoning process. Here's how:

1 The sticks of abrasives in the tool form an abrasive "cylinder" and are fed out radially with equal pressure in all directions. High spots and tight areas in the bore are abraded first.

2 The long abrasive sticks cut only on the crests of wavy or snaky surfaces until the bore has the same diameter throughout its full length.

3 The combination of tool motion (rotation and reciprocation) and feed pressure fractures the abrasive grits that have become dull, and new sharp edges are formed; the clean constant cutting action of every stroke on the full bore length consistently generates the desired surface finish.

One of the exclusive advantages of Microhoning is its ability to produce whatever functional surface characteristics are required for maximum product performance. Microhoning's cross-hatch pattern, with its myriad of minute intersecting "valleys," furnishes an excellent surface for retention of lubrication.



"Here's one of two Micromatic Model 523-2 machines used on the compressor crankcase job. Tecumseh uses a total of 18 Microhoning machines on other vital processing operations."

The principles and applications of Microhoning are thoroughly explained in an informative 16mm., 30-minute sound movie, "Progress in Precision." We'll be glad to reserve a print for your use. Just tell us on the coupon the date you'd like to see it.

☐ Please send me "Progress in Precision" in time for showing on _____ (date)

☐ Please send literature on Microhoning. I am interested in the following application: _____

NAME _____

TITLE _____

COMPANY _____

CITY _____ ZONE _____ STATE _____

MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

GRANODRAW SS®

-unique oxalate coating process

facilitates cold forming of stainless steel, eliminates leading and de-leading operations

The absorbent crystalline coating produced by this ACP process is chemically bonded to the pickled and activated metal surface and acts as a carrier for suitable lubricants. The combination of the Granodraw SS coating and lubricant greatly improves production and product quality in such cold forming operations as drawing of wire, bars and tubing; cold shaping; deep drawing; cold heading; ironing; necking; extruding; and upsetting. Among the other advantages of the Granodraw SS coating is the elimination of leading and de-leading operations; the storing of coated products indefinitely without breakdown of the coating or pitting of the base metal; and the short coating cycle. For complete information about Granodraw SS, write ACP today.

VISIT US AT BOOTH 2332, 38th National Metal Exposition & Congress, Cleveland Public Auditorium, October 8 to 12 inclusive.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICHIGAN ST. JOSEPH, MISSOURI NILES, CALIFORNIA WINDSOR, ONTARIO

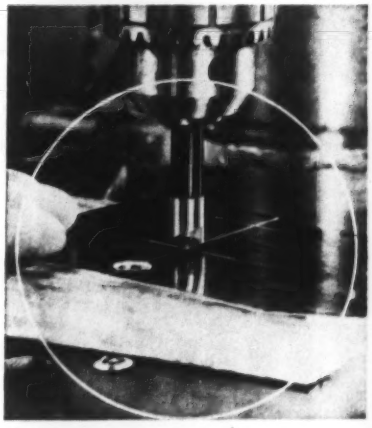
CHEMICALS ACP PROCESSES

ed. It's also used to hold doors, lid covers, trays and other appliance parts during shipping.

Adhesion to steel is 50 ounces per inch of width. Tensile strength is 45 lb per inch of width. The tape comes in 60 yard lengths in widths from ½ to 4 in. *Write*: Permacel Tape Corp., New Brunswick, N. J. *Phone*: Charter 7-7900

Sheet Metal Drill

Sheet steel, aluminum, brass and copper (0.001-in. to 10 gage) can be drilled by the Roto-Bor. It cuts from the outside of the circle in; holes are accurate, undistorted and almost burr-free.



Drilling can be done with portable or stand machines at drill press speeds. Work can be held by the hand; almost no torque is developed by the cutting process.

An axially retractable center point facilitates accurate positioning. *Write*: Jancy Engineering Co., Davenport, Iowa. *Phone*: 6-0991

Adhesives

Here are three epoxy resin adhesives which cure at room temperature to a strong solid state, under contact pressure.

The adhesives can be used for bonding aluminum, brass, copper, steel and other metals.

EC-1294 has good machining properties and offers high shear and bend strengths. EC-1474 is a lower cost adhesive that has a shear strength of 2015 psi after a seven-day cure. Good flexibility,

DIEBOLD
CARDINEER
ROTARY CARD FILES
ARE CUTTING
RECORD KEEPING
COST
EVERYWHERE!

Eliminating overtime . . . improving accuracy...and saving up to 50% in time and space costs...are the benefits thousands of firms enjoy while using Cardineers for all kinds of card records.

Diebold Rotary Card Files have brought *practical automation* to record keeping. At the touch of a button, Cardineers bring records to your finger-tips for fast referring, posting or changing operations. They cut productive work motions to an absolute minimum. They eliminate unproductive bustling.

For case histories on proven savings, call your local Diebold representative ...or mail the coupon today.

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Please send case histories that will give us ideas for improving our _____ records.

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Firm _____
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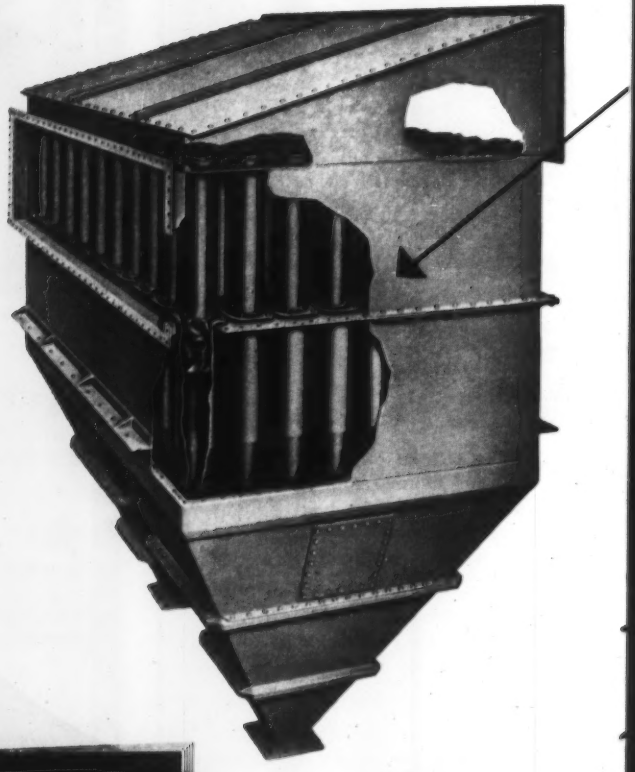
N-300-D

NEW

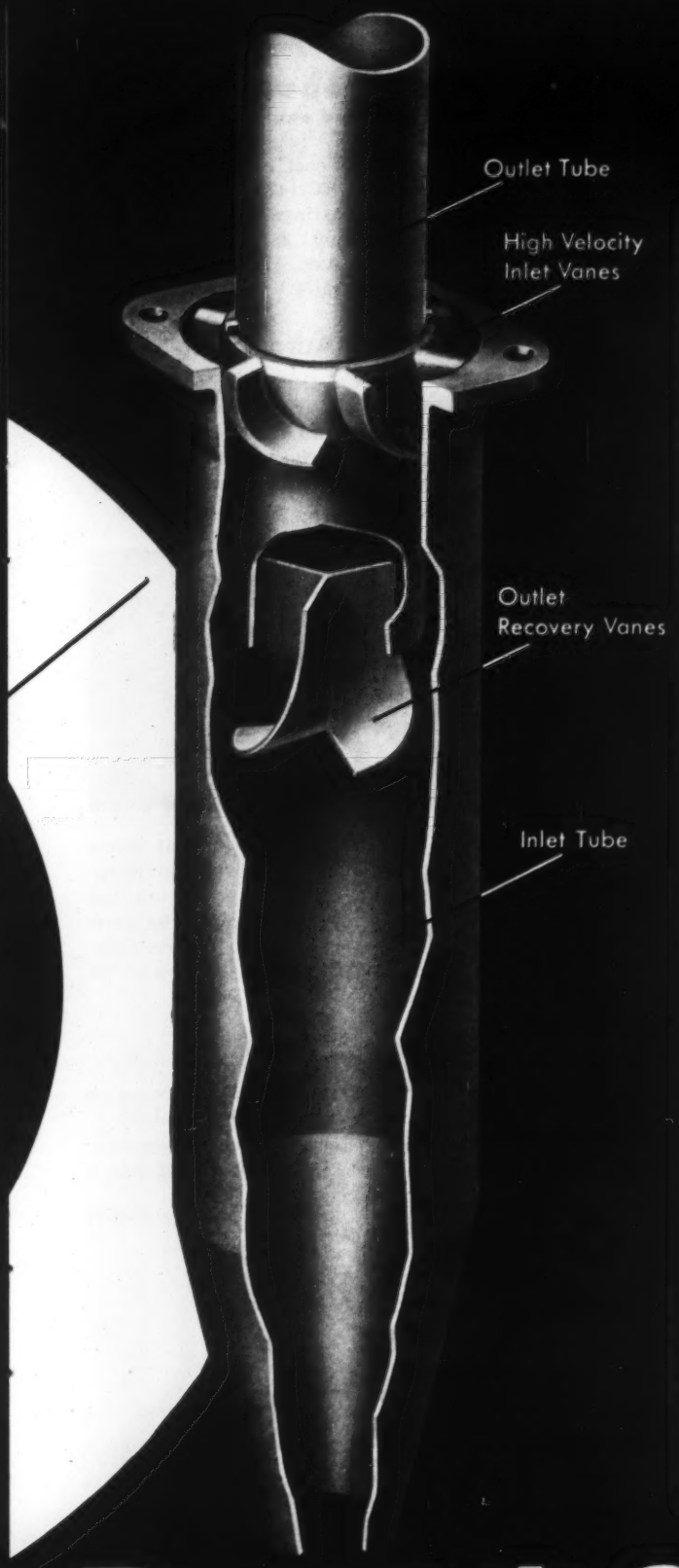
Cyclo-trell

Multiple Tube Dust Collector



Here are a few brief facts on Research's new multiple tube mechanical collector.

- Collection efficiencies are higher, for a given pressure drop, than other conventional multiple tube collectors.
- Gas flow per tube is higher than conventional units. This means fewer tubes per collector and lower total cost for a given capacity.
- Cyclo-trell's design is based on Research's 45 years experience in manufacturing gas cleaning equipment. As the largest manufacturer of electrical precipitators in the world, Research-Cottrell has engineered and built many combination units consisting of precipitators and mechanical collectors.
- Bulletin M gives complete details on design features, efficiency, capacity and detailed dimensional drawings. Write for your copy today.



Higher Collection Efficiency

An important reason for Cyclo-trell's higher collection efficiency is the aerodynamically shaped inlet vane unit. The purpose of these vanes is to produce a fast spiral of incoming gas. The faster these gases spin, the greater the centrifugal force on the suspended dust.

After testing many types and curvatures of vanes, Research found that this new design resulted in less turbulence, greater centrifugal force and higher collection efficiencies.

Greater Gas Handling Capacity

To develop a higher gas flow capacity than other multiple tube collectors, Research's engineers developed the following design features. First, by using a 10" diameter inlet tube, instead of the conventional 9" tube, the flow of incoming gas was increased.

The next step was to straighten the gas flow as it entered the outlet tube, since a spiraling gas stream creates more resistance than a straight through flow. In the Cyclo-trell this spiral is eliminated, and energy is recovered in the outlet tube by the Outlet Recovery Vanes. By positioning these vanes below the tube, rather than inside the tube, resistance has been further reduced.

This combination of features means greater gas flow per tube, fewer tubes per collector and a lower total cost for a given capacity and efficiency.

Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, New Jersey • 405 Lexington Ave., New York 17, N. Y.
Grant Building, Pittsburgh 19, Penna., 228 No. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.

Research Results Speak Louder than Words . . .

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FERROUS AND NON-FERROUS CENTRIFUGALLY CAST SLEEVES, ROLLS, LINERS, TUBES, RETORTS, CHUTES, RINGS, BUSHINGS, BEARINGS, ETC.

The success of a centrifugal casting is often determined long before the metal is melted and the casting formed. At Chief Sandusky, it starts in the research laboratories where experienced technicians are continually searching to improve existing methods and develop new ones to meet your specialized needs.

Each casting is then quality controlled through every step of the production process. The result of this supporting and preceding control is a finer, closer grained product which resists heat, corrosion, and abrasion.

Whatever your needs in ferrous and non-ferrous centrifugal castings—or in the way of technical aid or information, call on Chief Sandusky . . . continual leader in its field, continually improving its service to you.

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Chief SANDUSKY CENTRIFUGAL CASTINGS

FERROUS AND NON-FERROUS

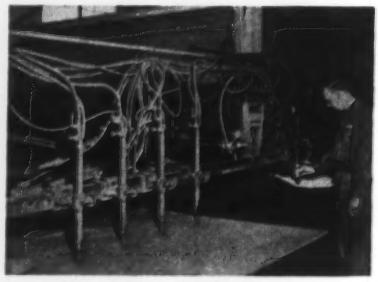
SANDUSKY FOUNDRY AND MACHINE CO., Sandusky, Ohio

NEW PRODUCTS and equipment

shock and peel resistance are offered by EC-1472. *Write*: Adhesives & Coatings Division, Minnesota Mining & Mfg. Co., 423 Piquette Ave., Detroit 2, Mich. *Phone*: Trinity 5-7111

Cutting Automation

With Cut-O-Mation, several cutting torches are lined up in tandem and operated from a single station. Preheat oxygen pressures are controlled to as many as eight machine cutting torches at a time.



A full, vigorous preheat flame gives quick edge starting or piercing. Once the cut is started, the flame is reduced instantly by moving a lever. *Write*: Harris Calorific Co., 5501 Cass, Cleveland, O. *Phone*: Woodbine 1-5700

Rectifier Welder

This direct current welder comes in 300 and 400-ampere models.

Side panels are easily removed. The recessed control panel has a

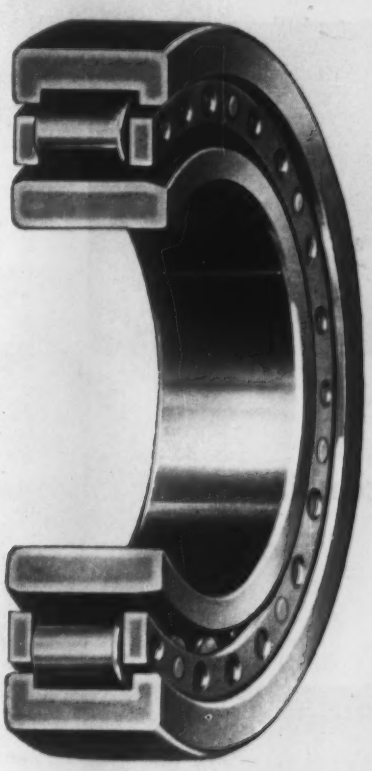
No job too little . . . or none too tough for BOWER STRAIGHT ROLLER BEARINGS

A complete line, a wide range of sizes to fit your specific needs

Square pegs weren't made for round holes. And aircraft bearings aren't built for farm equipment, either. That's why Bower designs a complete line of straight roller bearings—a line broad enough to meet any product requirement.

Jet planes break the sound barrier . . . need bearings that'll keep pace. So Bower aircraft bearings are engineered with exactness and precision to tolerances held to millionths of an inch. Bower tractor bearings, on the other hand, are built for ruggedness . . . to take heavy loads and real punishment, day after day, month after month.

Bower Roller Bearings are proved performers *in every field*, for *any* straight roller bearing application. From motors to earthmoving equipment, they're on the job—cutting maintenance and downtime, setting new standards of efficiency and economy. Get details on the *complete* line from a Bower engineer.



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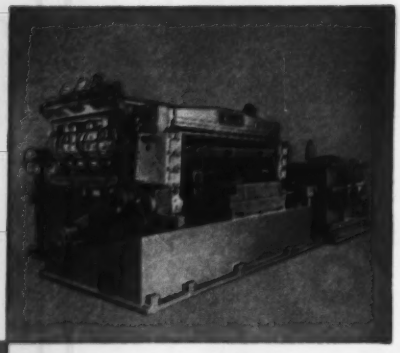
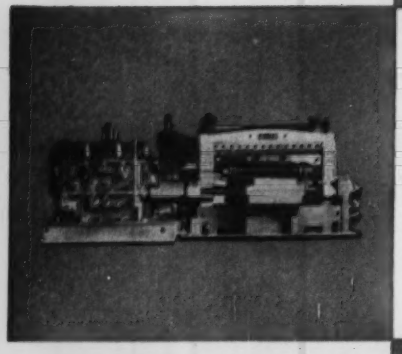
BOWER ROLLER BEARINGS

BOWER ROLLER BEARING DIVISION • FEDERAL-MOGUL-BOWER BEARINGS, INC., DETROIT 14, MICHIGAN

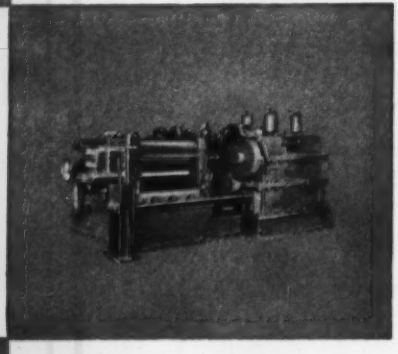
flexible design

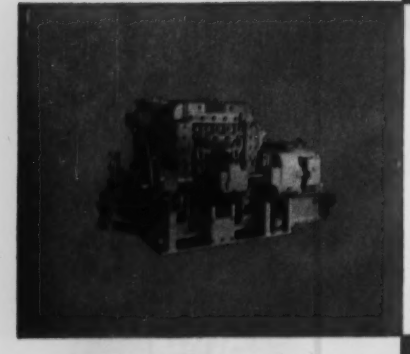




cutting accuracy

continuous feed





rugged construction

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"the shearing specialists"
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Sales Representatives

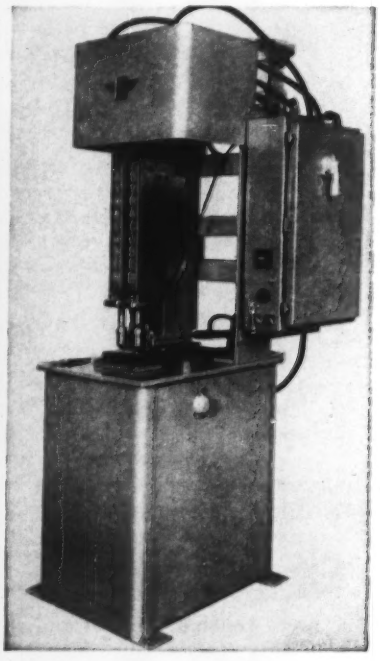
NEW PRODUCTS and equipment

polarity reversing switch and three coarse current adjustments with rheostat control for fine current adjustments.

The rheostat can be removed for remote control. The welder has thermostatic and current overload protection. *Write*: Hobart Bros. Co., Hobart Square, Troy, O. *Phone*: 2-1223

Stud Driver

Model SD10-2 is easily adaptable for one to three heads. Heads can be changed quickly to a new pattern.



Because heads can be spaced as close as 2½-in. center to center, they are easily integrated into automated index tables or conveyor lines.

Each head is driven by a ½-hp motor. *Write*: Syracuse Special Machine Co. Inc., 2900 E. Erie Blvd., Syracuse 3, N. Y. *Phone*: 72-6447

Lubricant

Klingfast 115 is a low viscosity, lead base gear and bearing lubricant for extreme pressure uses.

It provides a durable film which is difficult to remove either by

FAST REPLACEMENT

When a refinery has to shut down for a replacement or repair—that's the time when action and know-how count.

The special spiral fin unit here shown had to be built over a week-end to get a large oil refining plant back on stream.

Such repair and replacement work has added to the fine reputation Sun Ship has won through years of service in the construction of oil refining and chemical equipment of every kind.

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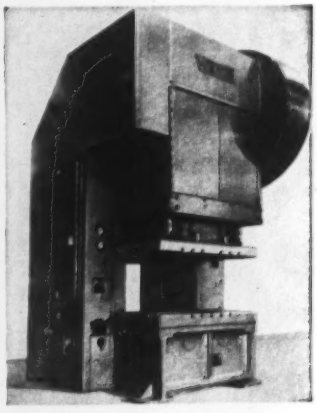
PENN BOLT AND NUT CO. P.O. BOX 9967, PITTSBURGH 33, PA.

gear pressure or gear speed. Power transmission is not retarded, and gear units work with greater efficiency.

The lubricant is pumped easily at temperatures below freezing, and its low viscosity permits easy starting. *Write*: Brooks Oil Co., 934 Ridge Ave., Pittsburgh 12, Pa. *Phone*: Allegheny 1-6484

Gap Press

This machine's electrical control system has extra outlets and cams which can be used to tie it into automation lines or to put ejector-type dies on automatic operation.

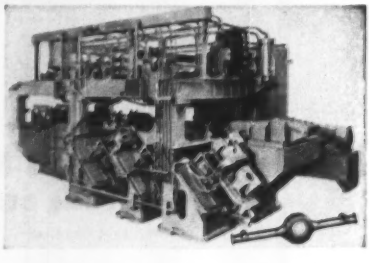


Piping and wiring are totally enclosed. An electronic indicator shows the exact position of the ram at any point in the stroke. *Write*: Verson Allsteel Press Co., 9300 S. Kenwood Ave., Chicago, Ill. *Phone*: Regent 4-8200

Transfer Machine

The Line-O-Matic automatically pierces, extrudes, machines and assembles three different rear axle housings for passenger cars and trucks.

Loading and unloading are automatic. All locating surfaces are



ÆSOP'S FABLES No. 3

Emerging from the marshes, the Quack Frog proceeded to announce to all the animals that he had a medicine for curing any disease, or for making one stronger and handsomer. Up spoke the Fox: "Ha, all you do is croak and quack all day . . . you don't really expect us to believe you can cure others when you cannot even heal your own bulging eyes, ridiculous legs and blotched, wrinkled skin?"

With this, Quack Frog immediately hopped back into the bog from whence he had come.

Moral:

Eventually, false claims or cure-alls are labelled as "Quack."

. . . there is, however, a "cure-all" when it comes to the bonding of fire brick . . . famous ADAMANT, the *original* high temperature cement, is literally *unbeatable* as a bonding agent. ADAMANT joints are gas-tight, metal-tight, withstand vibration . . . effectively resist abrasive action of dust-laden air . . . and, ADAMANT sets without shrinking or cracking . . . maintains its bond throughout temperature range. Our new Bonding Mortars bulletin #3 will gladly be sent on request.

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Whatever your handling operations may be, you can choose with confidence the Jomac Gloves that are right for them. And you can be sure of getting quality—lasting quality, stemming from 18 years of pioneering and leadership in the industrial work glove field.

Jomac Work Gloves are:

- made of cut-resistant, loop-pile Jomac Cloth—the fabric that protects hands from cuts and abrasion like no other
- manufactured in knit wrist, safety cuff or gauntlet styles—in heat-resistant, flame-proof, plastic-coated types
- great for economy—can be used, cleaned or reconditioned, and reused again and again
- adaptable—many styles are interchangeable, with *4* long-wearing surfaces per pair
- rugged—*they outwear canvas gloves by a profitable margin!*

Jomac manufactures all types of hand-to-shoulder protection. The choice is yours.

FREE JOMAC CATALOG

Write us (on your company letterhead) for your free Jomac Industrial Work Gloves Catalog—and for recommendations on types of gloves to use for your handling operations. We'll gladly supply sample gloves. Address: Jomac Inc., Dept. E, Phila. 38, Pa.

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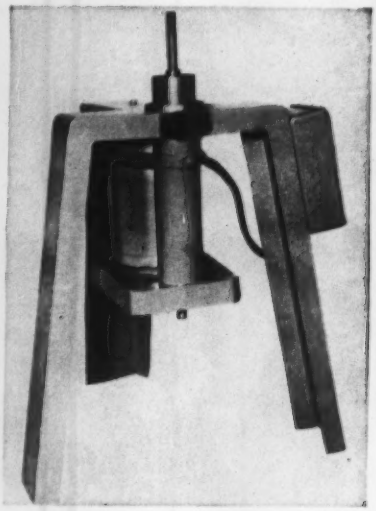
PLANTS IN PHILADELPHIA, PA., AND WARSAW, IND.
IN CANADA: SAFETY SUPPLY CO., TORONTO

NEW PRODUCTS and equipment

dirt and chip-free because the locating surfaces are upside down. *Write*: La Salle Tool Inc., 3840 E. Outer Dr., Detroit 34, Mich. *Phone*: Twinbrook 2-1525

Profile Router

Aluminum alloy formings are trimmed to exact finished shape by the 55-P.

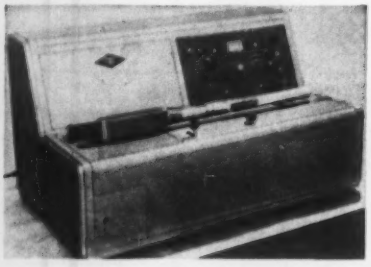


Plastic templates which may double as drill jigs are the only tooling needed for the unit. A rigid 10,000-rpm spindle assures effortless operation. *Write*: J. D. Wallace & Co. Inc., 1011 N. Detroit St., Warsaw, Ind.

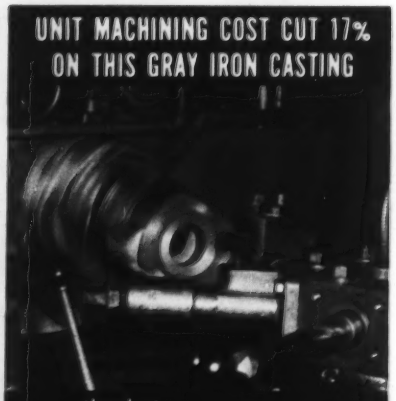
Torque Wrench Calibration

This tester simplifies accurate calibration.

The torque measuring system consists of an electronic amplifier and an indicating instrument with a rotating dial on which torque can be read.



UNIT MACHINING COST CUT 17% ON THIS GRAY IRON CASTING



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Users everywhere report similar experiences. In fact, on 67 machining tests in 11 large machine shops, castings of gray iron treated with FERROCARBO averaged 89.5% greater machinability per tool than untreated castings. These premium castings are finer grained, denser, stronger, yet they COST YOU NO MORE... because your foundryman, using FERROCARBO, makes worthwhile savings in raw material costs.

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Distinguished American Landmarks
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CLEVELAND: Hotel Cleveland

NEW PRODUCTS and equipment

In the low range (up to 2040 in-lb) each division equals 1 in-lb. The high range goes up to 6200 in-lb and each division represents 5 in-lb. *Write*: Electronics & Instrumentation Division, Baldwin - Lima - Hamilton Corp., 803 Massachusetts Ave., Cambridge 39, Mass.

Plating Rectifier

This air-cooled germanium plating rectifier incorporates automatic voltage stabilization and remote stepless reactor control.

A reactor controls output voltage; moving parts are eliminated. Maintenance costs and down time are reduced.

The units occupy less than 9 sq ft of floor space. Ratings range from 6 to 24 volts and up to 4000 amperes. *Write*: Rectifier Department, General Electric Co., Lynn, Mass. *Phone*: Lynn 3-6000

Paint Heater

Dualheet is a heater with a removable paint tract.

The tract is a heated chamber within the unit where the temperature of the paint is raised. No parts in the chamber are affected by the heat.

Periodic inspection of the paint tract is made by removing it from the unit. It can be replaced in 5 minutes.

The heater saves thinner costs, reduces atomizing air pressure and speeds painting.

A heavy duty model can raise paint temperatures to 160-180°F at the rate of 15 gallons an hour. The standard heater raises the temperature of 8 gallons to 160-180 degrees in an hour. *Write*: Binks Mfg. Co., 3122 Carroll St., Chicago 12, Ill. *Phone*: Van Buren 6-4200

Lubrication Unit

Lubro-Control 33AG-4 supplies air-actuated feed mechanisms, chucks, clutches, brakes and other air-operated parts of machine tools with oil-fog lubrication, filtered air and regulated air pressure.

A visible oil feed gives accurate

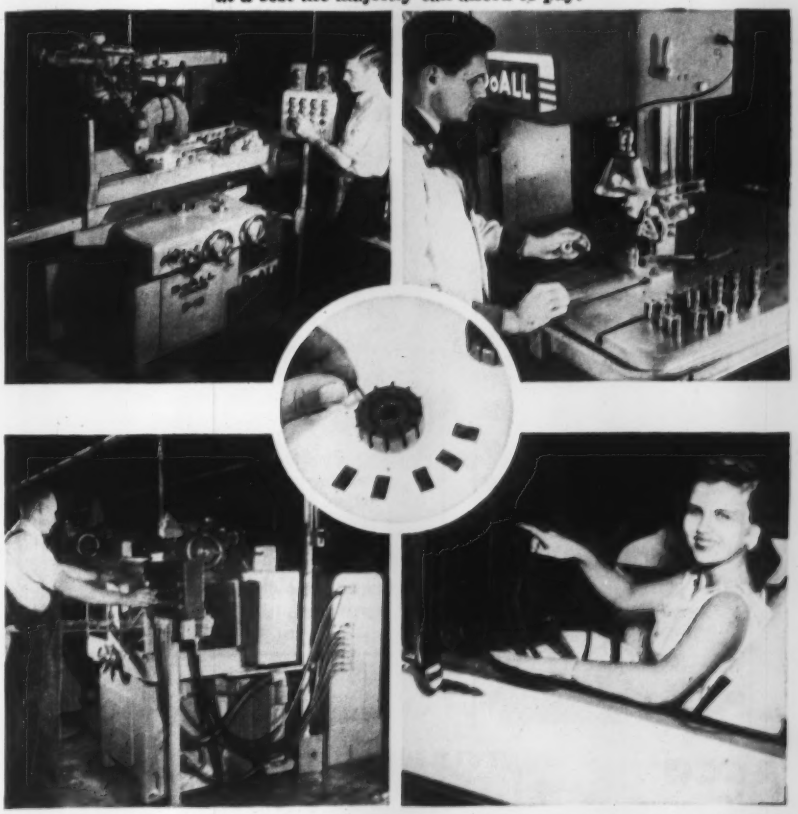
Easy Steering...Down The Road of Abundance

Nearly 40% of new cars have mechanical muscles on the steering wheel. The power steering story is a digest of the American way. Men using standard machine tools and methods wouldn't be able to produce its precision parts at a price most people, including themselves, could pay. Therefore, the automobile industry risked its money on the special machines illustrated to do the job at lower cost. The DoALL band machine shown, automatically slots power steering pump rotors in half the time required by other methods. The special grinder automatically finishes the slots at a rate of 1000 per hour. A standard DoALL grinder produces at low cost the vanes that fit in the rotor slots. Accuracy is measured in ten thousandths of an inch and surface finishes in millionths.

As a result of the time and money saving made possible by these ingenious "tools", power steering is priced within the reach of all, including the men who produce it.

So, back of power steering you have the fascinating fundamental of the American economic system: all of the modern conveniences that make up man's material welfare stem from the tools of production, purchased with the savings of the thrifty and the profits of business. Anything that retards reasonable profit retards investment in tools and puts the brakes on continuous improvement of our living standards.

It takes machines like these, costing up to $35,000 each, to produce power steering at a cost the majority can afford to pay.



RESEARCH REPORTS showing the latest techniques for sawing, grinding and lapping of materials are available upon request without obligation through your local DoALL Store. Factory trained machining specialists are available to help you reduce your costs.

Reprints available for your employees.

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Des Plaines, Illinois
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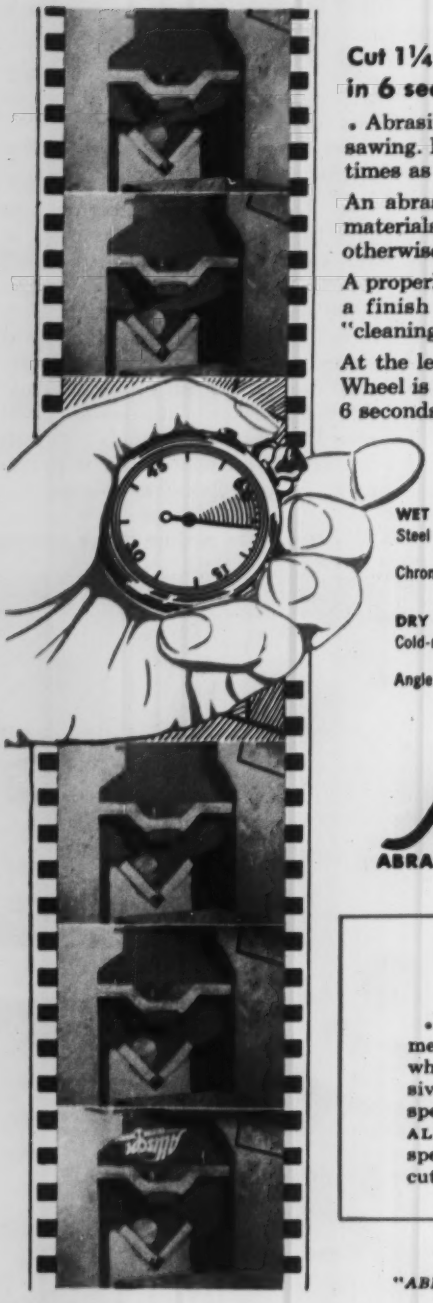
Abrasive Cutting | *the best way to cut many materials the only way to cut some*

Allison Cut-Off Wheels



Cut 1¼" Bar Stock in 6 seconds

• Abrasive wheel cutting is faster than sawing. In many cases it is ten to twenty times as fast.

An abrasive wheel will cut the hardest materials with ease. No need to anneal or otherwise prepare material for cutting.

A properly selected abrasive wheel leaves a finish which requires little, if any, "cleaning-up" operation.

At the left an ALLISON Abrasive Cutting Wheel is shown cutting 1¼" bar stock in 6 seconds per cut.

HOW'S THIS FOR PERFORMANCE?

	Cutting Time
WET CUTTING	
Steel Bar.....8" dia... Rotary-type machine.....	320 seconds
Chrome Steel Bar.....4" dia... Oscillating-type machine..	105 seconds
DRY CUTTING	
Cold-rolled Steel Bar..1" dia... Chop Stroke-type machine..	2 seconds
Angle Iron.....1" x 1" x ⅛".. Chop Stroke-type machine..	2 seconds

Allison
ABRASIVE CUTTING WHEELS

It pays to consult a specialist

• Profitable abrasive cutting means using the right abrasive wheel...and the proper abrasive cut-off machine...for the specific job. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

Send for Booklet "ABRASIVE CUTTING" today

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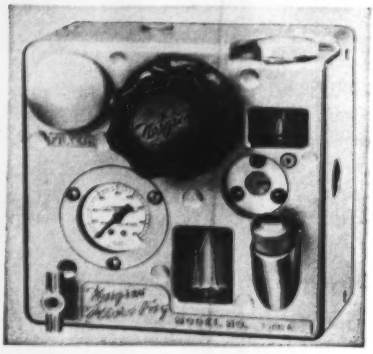
AMERICAN CHAIN & CABLE

254-B Island Brook Avenue, Bridgeport 8, Conn.

NEW PRODUCTS and equipment



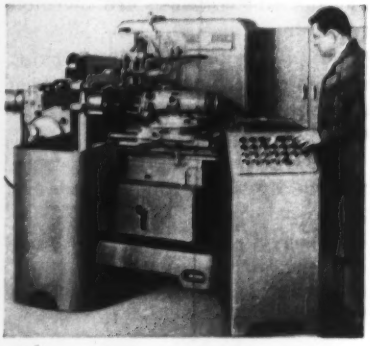
flow control and offers proof of lubrication.

No tools are needed to change filters or to refill the ⅝-pint oil reservoir. The unit comes in ½-in. pipe size and regulates air pressures of less than 125 psi. *Write*: C. A. Norgren Co., 3400 S. Elati St., Englewood, Colo. *Phone*: Sunset 1-5583

Gear Loader

Here is an automatic device for handling spur or helical internal gears on shaving machines.

The loader solves the problem of meshing the teeth in an internal gear with those of the helical gear-shaped shaving cutter.



An intermediate air-powered loading sleeve mechanism receives the internal gears one at a time from a magazine feed. *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980

Drop Forging Hammer

The Rigidrop is a piston-lift gravity hammer that gives the operator complete control of stroke

Now you can get from PROGRESSIVE Slotted Tapping Screws with an extra customized touch — Slotted Tapping Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

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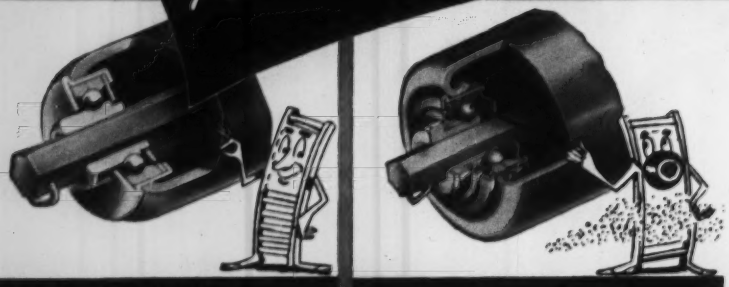
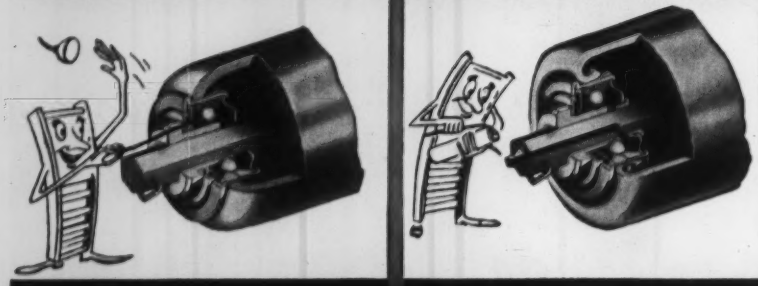


Plain Ball Non-Lubricated Bearings

Dustproof Labyrinth-Sealed Bearings



Grease-Packed-For-Life Bearings

or Pressure Lubricated Bearings

TO MEET YOUR REQUIREMENTS

In roller conveyors, it's the bearing that counts! And BUSCHMAN conveyors use only performance-proven bearings... engineered for long life and trouble-free operation in every type of service. No matter what normal operating conditions may be, BUSCHMAN has a conveyor pre-engineered to meet your needs.

Conveyors are available with various types of rollers and frames, in different sizes and spacings, and in any width from 6 inches on up. BUSCHMAN can supply 45° and 90° curved sections, switches, spurs, work stations and other components to provide a complete, efficient materials handling system.

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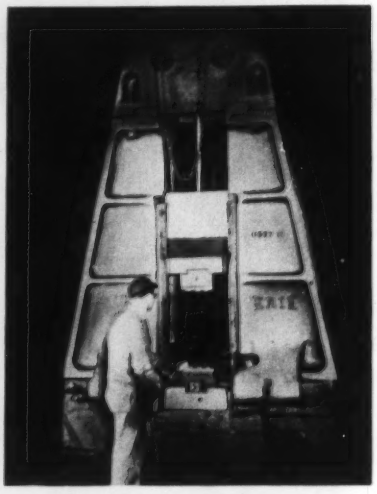
variation merely by varying pressure on the treadle.

To improve accuracy, a guiding arrangement increases the guiding surface by 40 per cent. The ram of the hammer can be removed at die level without jacking.



Clamp faces are set directly opposite one another to provide positive clamping action without bending the rod. *Write*: Erie Foundry Co., Erie, Pa. *Phone*: 2-6754

Tool Steel

Graph-Air is a tool steel which air-hardens from 1450 to 1525°F.

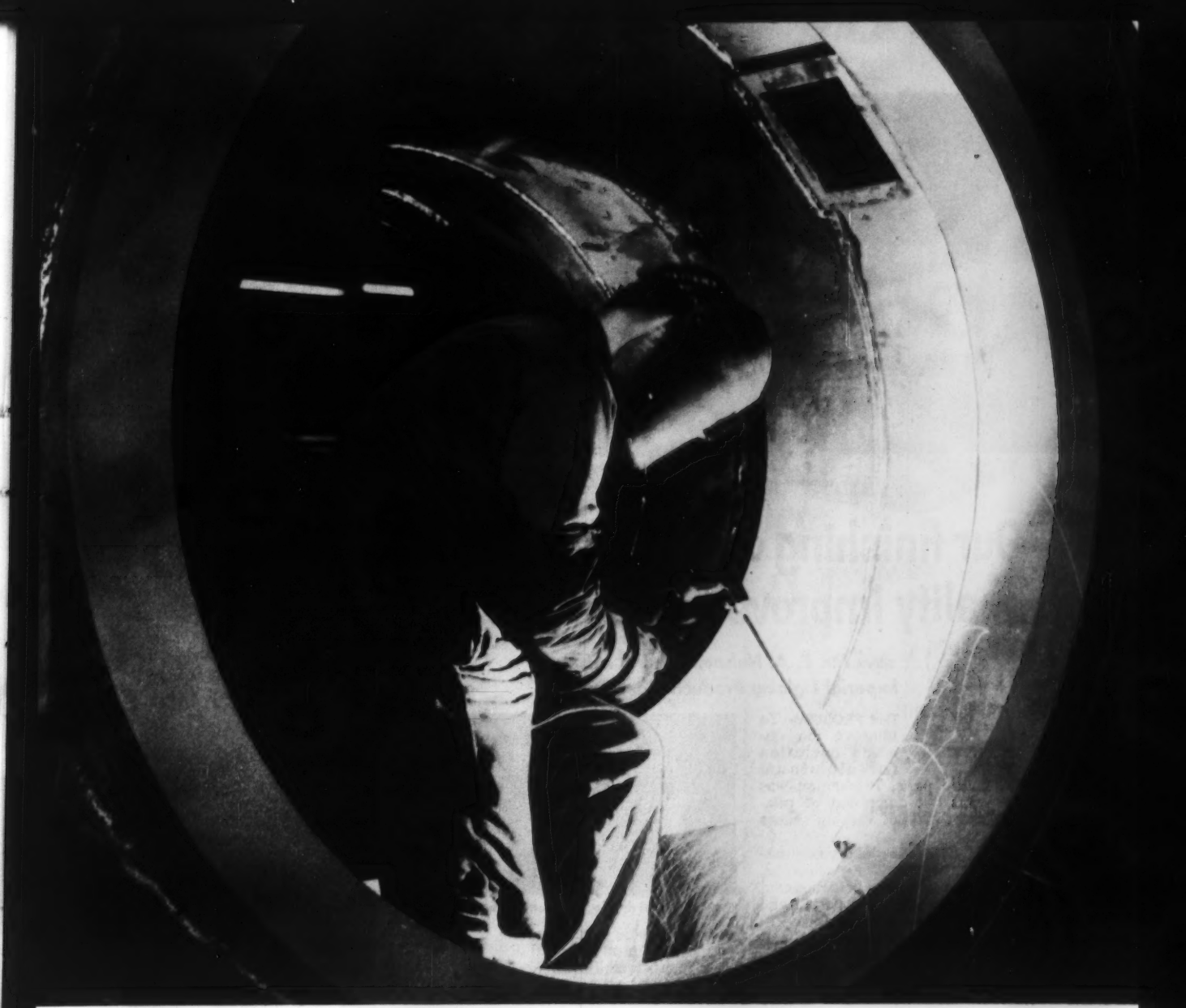
Because of the low hardening temperature, the steel is less susceptible to decarburization and distortion in heat treatment. Its graphite content gives the steel excellent machining qualities, high resistance to wear and good anti-friction properties.

It is dimensionally stable and resists abrasion. *Write*: Timken Roller Bearing Co., Canton 6, O. *Phone*: Glendale 3-4511

Broaching Press

This hydraulic unit broaches a radius groove in both ends of two pinion gear blanks which differ in length. Production: 2080 pieces an hour.

Operation is automatic. Blanks are loaded into hoppers on each side of the machine, then positioned and loaded into feed magazines by vibration. Twin pushers



Standard Steel forged flanges cut manufacturing costs for Elliott Company

For the heavy bolting ring flanges on their synchronous condenser shells, Elliott Company has turned to Standard Steel forged flanges. They get a better product at lower cost because:

- Flanges are forged very close to final tolerances, so expensive machining time is greatly reduced.
- Uniform grain structure permits faster drilling of bolt holes—40 in each flange.
- The high strength of Standard Steel forged flanges provides an ample safety factor to withstand any accidental explosion pressures.

Next time *you* need rings, flanges, gear blanks, shafts, wheels, or special shapes —and need them fast—get our quotation first. For bulletin 10,000, write Dept. 9246, Standard Steel Works Division, BLH Corporation, Burnham, Penna.

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Faster finishing of higher quality is made possible by this Binks installation at Imperial Lighting Products Company, Latrobe, Penn.

"Our finishing output up 30%, quality improved-costs cut..."

says Mr. E. A. Nelson, General Manager, Imperial Lighting Products Company.

THE PROBLEM: To improve the finishing operation for aluminum light fixture parts. Production was continuous but composed of relatively short runs of varying shapes and sizes.

THE SOLUTION: A Binks semi-automatic spindle spraying machine. Rotating vertical spindles, mounted on a conveyor, spin the parts to be finished. As the parts pass the operator he coats them quickly and uniformly using a manually operated Binks Model 18 spray gun. The spindles are spaced to accommodate large parts on alternate spindles or smaller parts on every spindle.

THE RESULTS: So gratifying, according to Mr. Nelson, that a second Binks semi-automatic spindle machine was installed. Both machines have more than paid for themselves. A third, fully automatic, machine has been ordered for production-rate finishing of small parts.

General view of the semi-automatic machines

- Automatic parts handling speeds production
- Finish is uniform
- Material waste minimized
- Rejects reduced.

Free analysis and engineering help: If you would like to know what production rates or costs you could obtain with Binks semi-automatic or automatic spraying machines, Binks research department will run actual test on *your* products and supply you with a detailed report. Just call your nearest Binks Branch Office or write us direct.

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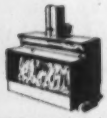
GUNS



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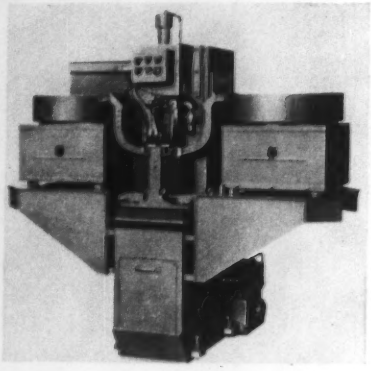
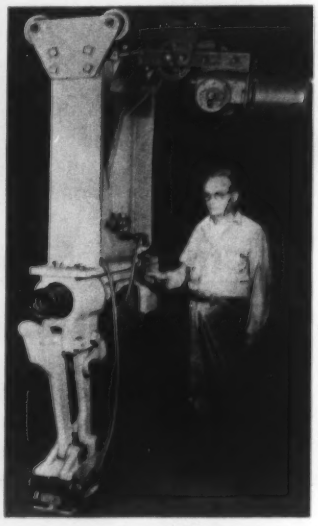


attached to the hydraulic press ram move the blanks through stationary broaches. Parts are unloaded into ejection chutes.

Hopper loading can be automatic. The machine will stop when hoppers are empty. *Write*: Department 141, Detroit Broach & Machine Co., Rochester, Mich.

Billet Marker

Heat numbers, cut letters and ingot numbers on the marking head of Model 701 can be changed from the operator's pulpit.



Marking heads can be designed to fit almost any requirement down to 3-in. thick slabs and 4 x 4 in. billets. *Write*: M. E. Cunningham Co., 1038 Chateau St., Pittsburgh 33, Pa. *Phone*: Allegheny 1-3280

NEW literature

Write directly to the company for a copy

Collapsible Taps

Bulletin G-93, 10 pages, describes receding chaser collapsible taps used on vertical tapping machines to make taper threads. Landis Machine Co., Waynesboro, Pa.

Diecasting

A cold chamber machine for diecasting aluminum, magnesium and brass is described in a 4-page folder. Cuyahoga Industries, 17920 Waterloo Rd., Cleveland 19, O.

Milling Machine

Features of a bed-type, production miller are presented in a 10-page bulletin. Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O.

Maintenance Tower

A one-man maintenance tower with a platform that can be raised 10 ft (from 7 to 17 ft) in 25 seconds is described in a 4-page bulletin. Safeway Steel Products Inc., 6234 W. State St., Milwaukee 13, Wis.

Wire Rope Endings

Bulletin DH-531, 4 pages, describes wire ropes ending in a thimble or loop. Wire Rope Sling Department, American Chain & Cable Co. Inc., Wilkes-Barre, Pa.

High-Temperature Alloy

Properties of Hastelloy R-235, a wrought precipitation-hardening alloy with a nickel base, are presented in a booklet. Haynes Stellite Co., 30-20 Thomson Ave., Long Island City 1, N. Y.

Sodium Silicate

Properties of various grades of sodium silicate used in the CO_2 process for hardening cores and ingredients for collapsibility are discussed in an 8-page bulletin. Grasselli Chemicals Department, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.

Standards

This 20-page bulletin tells how standards are developed, accepted and approved and who uses them. Department PR, American Standards Association, 70 E. 45th St., New York 17, N. Y.

Automatic Plating

Features of automatic plating and processing machines are presented in a 4-page bulletin. Udylite Corp., Detroit 11, Mich.

Electrified Baseboard

Industrial uses of electrified baseboard are included in an 8-page bulletin, 590. Wiremold Co., Hartford 10, Conn.

Automatic Dockboards

A 4-page bulletin, D-160, presents a line of automatic dockboards for loading docks. Kelley Co. Inc., 316 E. Silver Spring Dr., Milwaukee 17, Wis.

Buffing Machine

A semiautomatic unit for grinding, polishing, buffing, satin finishing and coloring with buffs, setup wheels or belts is illustrated in a 1-page bulletin. Oswald Mfg. Co., 50-17 47th Ave., Woodside 77, N. Y.

Crawler Tractors

A 16-page bulletin shows crawler tractors, scrapers and graders at work. Sales Promotion Department, Tractor Group, Allis-Chalmers Mfg. Co., Box 512, Milwaukee 1, Wis.

Drilling, Tapping Machines

A 73-page catalog presents drilling and tapping machines, air and hydraulic valves and air powered automatic drill press feeds. Beckett-Harcum Co. Inc., Wayne Rd., Wilmington, O.

Motor Pulleys

Bulletin V-563, 8 pages, presents a motor pulley line with capacities of ¼ to 1½-hp. Reeves Pulley Co., division of Reliance Electric & Engineering Co., 1225 Seventh St., Columbus, Ind.

Broaching Machines

Operating characteristics and capacities of dual ram broachers are given in bulletin MVT-56, 4 pages. Colonial Broach & Machine Co., P. O. Box 37, Harper Station, Detroit 13, Mich.

Electrolized Chain

Corrosion resistance, strength and wearing characteristics of this roller chain are discussed in a 4-page bulletin. Atlas Chain & Mfg. Co., West Pittston, Pa.

Chrome Diffusion

The Chromalloy process (high temperature diffusion of chromium into surfaces) increases heat, wear and corrosion resistance of steel parts. It is described in a 4-page bulletin. Chromalloy Corp., 450 Tarrytown Rd., White Plains, N. Y.

Material Handling

A 52-page catalog, 400, describes fork and platform lift trucks, gaso-

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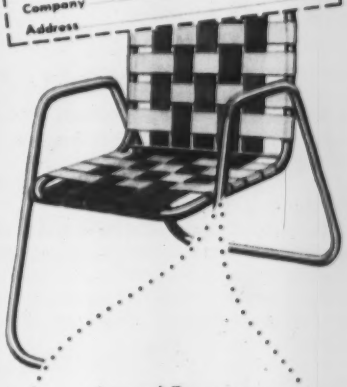

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NEW LITERATURE

line and electric tractors and industrial trailers and hand trucks. Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill.

Standards

A 56-page catalog indexes 1600 booklets on standards. American Standards Association, 70 E. 45th St., New York 17, N. Y.

Batteries

Bulletin 5918, 8 pages, lists advantages of these batteries for electric industrial trucks. Exide Industrial Division, Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa.

Assembly Testing

Bulletin TDS 1110, 12 pages, describes components for designing and testing of electromechanical assemblies. Servo Corp. of America, 20-20 Jericho Turnpike, New Hyde Park, Long Island, N. Y.

Welding Positioner

A specification sheet, R-1700-S14, describes a powered, bench model welding positioner. Positioning Equipment Division, Worthington Corp., Plainfield, N. J.

High Speed Movies

A 12-page bulletin tells about advances in film sensitivity which have extended the use of movies in industry. Professional Goods Division, Eastman Kodak Co., Rochester 4, N. Y.

Brush Finishing

A 4-page bulletin tells how to use centerless grinding machines for precision brush finishing. Osborn Mfg. Co., Cleveland, O.

Protective Coatings

Bulletin 760, 30 pages, covers the use of paints in mild to severe corrosive service. Plastics & Synthetics Division, U. S. Stoneware Co., Akron 9, O.

Cold Water Deaerator

Bulletin 4653, 4 pages, describes the advantages and operating principles of cold water deaerators. Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32, Pa.

Electronic Air Cleaners

Packaged air cleaners built into the return air duct of heating or air conditioning systems are described in bulletin E-40, 8 pages. Trion Inc., 1000 Island Ave., McKees Rocks, Pa.

Carbide Blanks

Bulletin 851C, 12 pages, lists a line of carbide blanks in various sizes, styles and shapes. Besley-Welles Corp., 851 Dearborn Ave., South Beloit, Ill.

Steel Boxes

Pallet-type steel boxes that fold and stack are covered in an 8-page bulletin. Hamlin Metal Products Co., Akron 19, O.

Abrasion Testing

Bulletin 5604, 6 pages, describes a machine for testing the resistance of surfaces to rubbing abrasion. Taber Instrument Corp., 111 Goundry St., Section 31, North Tonawanda, N. Y.

Flexible Couplings

Features and uses of flexible couplings with torque capacities from 1/80 to 3500 hp are presented in bulletin 203, 4 pages. Lord Mfg. Co., Erie, Pa.

Nylon Tubing

An 8-page bulletin describes nylon pressure tubing used in power lubrication. Polymer Corp. of Pennsylvania, Reading, Pa.

Hydraulic Valves

Catalog H-12, 92 pages, describes valves that control and direct oil hy-

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draulic fluid power. Commercial Shearing & Stamping Co., 1775 Logan Blvd., Youngstown 1, O.

Swaging Equipment

Bulletin SM56, 16 pages, contains technical data on the rotary swaging process. Fenn Mfg. Co., Newington, Conn.

Nickel Alloys

Properties of wrought and cast high-nickel alloys at low temperatures are presented in this booklet. Readers Service Section, International Nickel Co. Inc., 67 Wall St., New York 5, N. Y.

Indicator Gages

This engineering manual eliminates many design hours involved in the ordering of large diameter gages. Boice Gages Inc., Staatsburg, N. Y.

Refractories

A complete line of refractories is presented in bulletin 200, 4 pages. Bulletin 225, 2 pages, covers plastic insulations for hot face temperatures of 200 to 1100°F. J. H. France Refractories Co., 3152 France Rd., Snow Shoe, Pa.

Lathe Centers

Centers for lathes and cylindrical grinding machines and grinder dogs are presented in bulletin CD-56, 16 pages. Ready Tool Co., 554 Iranistan Ave., Bridgeport 5, Conn.

Turbine Pumps

Water and oil lubricated vertical pumps are described in bulletin WO-53. Layne & Bowler Inc., Memphis 8, Tenn.

Fork Trucks

Construction details, operating characteristics and maintenance features of a line of lift trucks are given in a 16-page bulletin. Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich.

CO_2 Core Hardening

Details and advantages of the CO_2 process for hardening cores and molds are presented in a 38-page booklet. Carver Foundry Products Co., 1056 Hershey Ave., Muscatine, Iowa.

Combustion Control

A review of basic ideas in the automation of combustion is given in a 15-page bulletin. Department A, Cleveland Fuel Equipment Co., 1111 Brookpark Rd., Cleveland 9, O.

Coatings

Bulletin Chem C-2, 4 pages, describes chemical resisting organic coatings. Metal & Thermit Corp., Rahway, N. J.

Carloading Guide

A 48-page booklet tells how to package and load cars for maximum product protection at minimum cost. Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill.

Chuck Catalog

A 91-page catalog, 66-1956, lists a complete line of manually operated chucks. Cushman Chuck Co., Hartford, Conn.

Flexible Couplings

A wall chart reduces the time needed to select a coupling. Industrial Sales Division, Morse Chain Co., Ithaca, N. Y.

Magnesium Dust Control

An 8-page bulletin describes a wet method for collecting and controlling magnesium alloy dust and fumes. Peters-Dalton Inc., 17900 Ryan Rd., Detroit 12, Mich.

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STEEL

September 17, 1956

Market Outlook

THE steel business is buoyant.

You can see this from the national rate of steel ingot production. It rose to 100.5 per cent of capacity in the week ended Sept. 16. This equals the year's high mark set at the end of April. Four districts are above the national rate: Buffalo, with 107.5 per cent; Cleveland, with 107; Youngstown, with 105; and Chicago, with 101.

BONA FIDE—The reason the industry is operating at such a high level is that it has the necessary orders. With only minor exceptions, the steel plants don't turn out finished steel for their own inventory. Steel is tailor-made to a customer's requirements.

COMPARISON—Only in December did the national rate get up to 100 per cent of capacity last year, and yet yield last year was at an all-time high—117 million net tons of ingots. Each point of the operating rate this year provides more ingot tonnage than it did last year because capacity has increased.

CAPACITY RISING— Not only was the ingot capacity 2.6 million tons larger on Jan. 1, 1956, than it was a year earlier, but it has increased approximately 1 million tons this year through expansion projects (see page 134). The capacity will continue to go up as other projects progress. In addition, there will be capacity increases through improvements of steelmaking practices. By Jan. 1, the country's ingotmaking capacity should be 132 million tons, or 3.6 million above this year's Jan. 1 level.

The capacity increase achieved thus far this year has enabled the steel industry's operating rate to recover so rapidly after the steelworkers' strike. The rate is computed on Jan. 1, 1956, capacity.

WATCH FOR AUTOS— The high rate of current production is without benefit of strong demand from the automobile industry. It has not come into the market in force for steel which will go into 1957 models. If it does, expect a real scramble for tonnage. Cold-rolled carbon sheet is in fairly prompt supply.

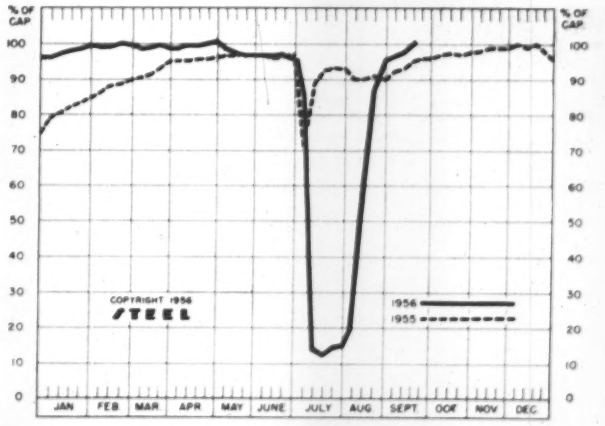
Steel plate fabricators with governmental contracts are calling with increasing frequency on agencies of the government for help in expediting deliveries on tonnage due. Concrete reinforcing bar backlogs are heavy and new demand is brisk. Distributors are booking as far ahead as mid-1957. Steel piling is in critical supply.

BRIGHTER—Strengthening of farm prices is brightening the outlook for merchant wire products. One midwest wire producer expects its 1956 sales of fencing and other farm goods to equal or slightly top those of last year.

Strong demand for steel the world over is boosting prices of steel imported into the U. S. For extended deliveries, western European countries have raised prices anywhere from 5 to 65 cents per 100 lb.

PRICE TRENDS—Domestic steel prices are steady, so STEEL's price composite on finished steel remains at $137.75 a net ton. Tin mill products, priced on six-month contracts, will rise 10 cents a base box Nov. 1. Steelmaking scrap pushed up again, raising STEEL's price composite on it to another new record, $59.67.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

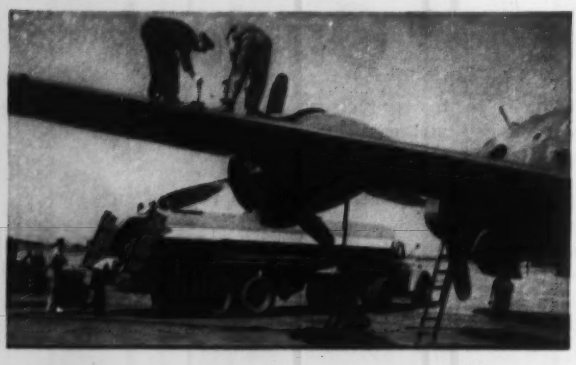
	Week Ended Sept. 16	Change	Same Week 1955	Same Week 1954
Pittsburgh	100	+ 3*	97.5	66
Chicago	101	0*	96.5	69
Mid-Atlantic	98	+ 1	93	60
Youngstown	105	0	100	51.5
Wheeling	98.5	+ 0.5	97	90
Cleveland	107	+ 4.5*	98	77.5
Buffalo	107.5	+ 0.5	105	56.5
Birmingham	95.5	— 0.5	95.5	75
New England	90	0	86	50
Cincinnati	91	+ 1	89.5	52
St. Louis	88	0	106	66.5
Detroit	97.5	+ 6.5	94	68
Western	97	+ 3	103	81
National Rate	100.5	+ 2.5	95.5	66

INGOT PRODUCTION‡

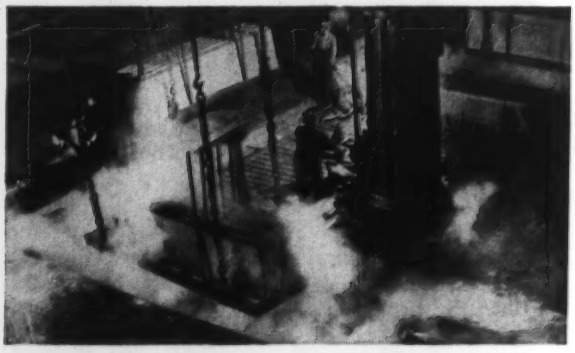
	Week Ended Sept. 16	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	153.3†	151.2	134.1	143.7
NET TONS (In thousands)	2,463†	2,429	2,154	2,309

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

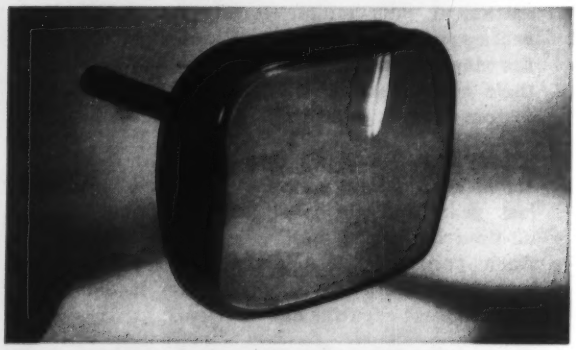
ANHYDROUS Hydrofluoric Acid for alkylation catalyst; also catalyst and fluorinating agent in many other organic and inorganic reactions.

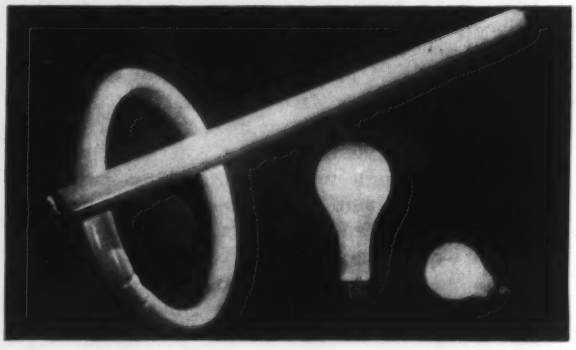


AQUEOUS Hydrofluoric Acid for steel pickling, glass frosting and etching; also for electropolishing of metals, ore flotation, manufacture of other chemicals.



For "HF" Call GENERAL





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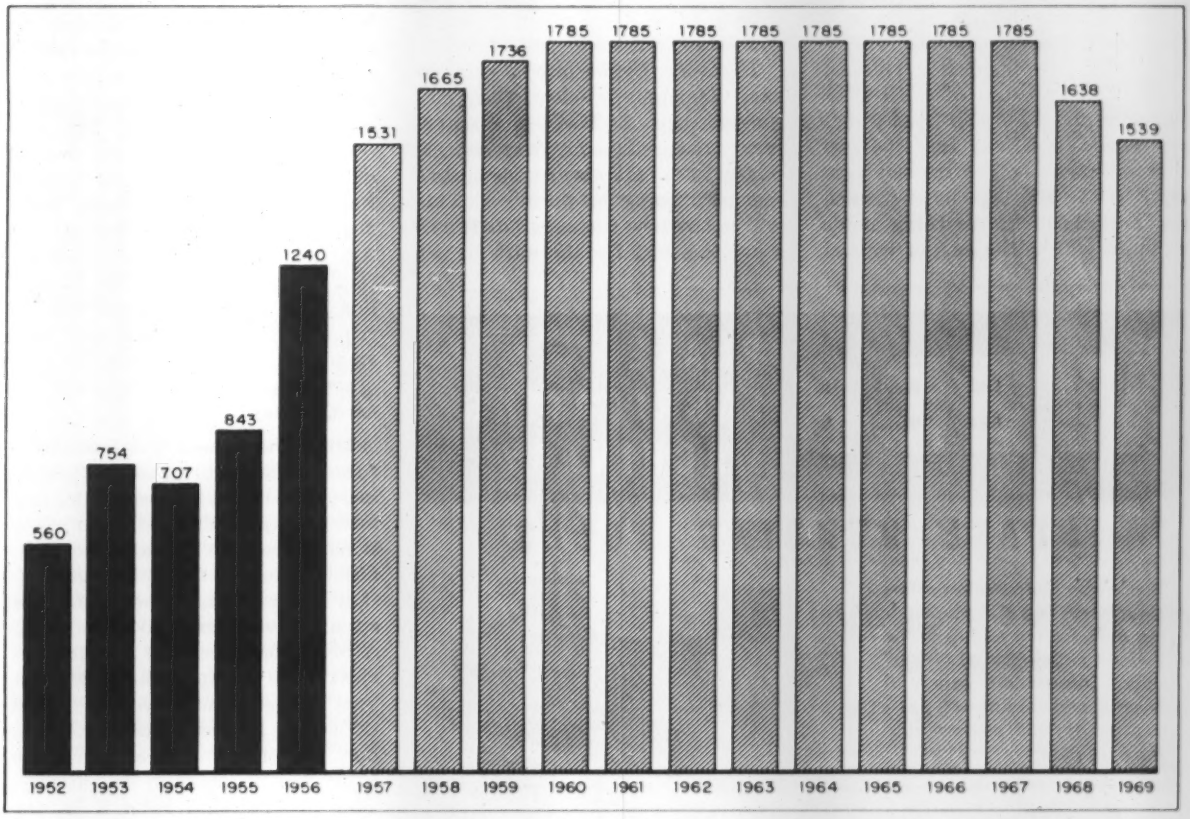

Source: American Institute of Steel Construction. Figures for 1952-1956 are based on AISC bookings of fabricated structural steel for highway bridges. Figures for 1957-1969 are estimated by U. S. Bureau of Public Roads.

Structural Supply Tightens

Federal highway program heaps demand upon demand. Already mills are working at capacity. Expansion by mid-1957 will not be enough to cover requirements

STRUCTURALS are going to be in tight supply as far into the future as you can see. If you have any doubt about this, take a look at the graph above.

Even if all other users were to remain at present levels for the next 13 years (which isn't likely), this tremendous upsurge in the nation's roadbuilding program alone would keep things tight. By 1958, requirements of the program for structurals and plate will be three times what they were in 1952, with wide flange and standard structurals representing about two-thirds of the total. Capacity for these heavy shapes is being increased—but not nearly enough, in the opinion of most observers. Where will the steel come from?

Capacity Up — Steel producers say that something has to give somewhere if the program is to go ahead on schedule. In 1954, capacity for heavy structurals was 5,565,270 tons; in 1955, it increased slightly to 5,785,412 tons. Latest figures (see page 136) put capacity at 6,232,224 tons on Jan. 1, 1956.

You get a structural capacity of 7,497,224 tons by mid-1957 when you add these figures: About 325,000 tons started up at Inland Steel Co. earlier this year; 100,000 tons due next spring at U. S. Steel Corp.'s South Works in Chicago; and 840,000 tons due at Bethlehem Steel Co.'s Saucon Division sometime in first half, 1957. In addition, Kaiser Steel Corp. is expanding rolling capacities on the West Coast, but the exact amount going into structurals is not known.

Without the government's roadbuilding program, that tonnage would be enough to meet the present wants of other users. But their demands, which have taxed plate and structural mill capacities for several years, are also increasing. "If all other users would level off or slack up a bit, we might be able to supply the road builders with the steel they need without disturbing our other regular cus-

tomers," says one steel executive. "The increase in capacity scheduled for next year just won't be enough otherwise," he adds.

Two Sides — Representatives of the two trade associations watching the developments closest (American Institute of Steel Construction and American Road Builders' Association) say that the biggest problem confronting the program is the shortage of engineers, not materials. "If anything holds us up, it will be the lack of trained engineers to plan the vast network of highways," one official says. "How can we say there isn't enough steel? We haven't tried yet. It will take a lot of hard effort from all concerned, but we'll make it."

Highway people are trying to ease the supply problem. Their major strategy: 1. There is a movement among state highway departments to standardize on structural members going into bridges. This will not reduce tonnage, but it will make it easier for the mills to get the most out of their facilities. 2. They are studying methods to encourage steel producers to increase structural capacity—for the good of the highway program and the general economy. 3. Where practical, spans will be specified for prestressed concrete if structural members are not available. The success of this last move may depend on the ability of the mills to meet the demand for reinforcing steel. John N. Roberts, president of the American Road Builders' Association, estimates that about 17 million tons of this material will be required by the program as it now stands. (About 49 million tons of other miscellaneous steel will be used, he says.)

Slim Chance—In the immediate future, chances are dim for further increases in mill capacity to roll heavy shapes. There are no additional expansion plans at present, although one or two companies say they are continually watching the situation with expansion in mind. A break could come if the government were to open the expansion goal for structural capacity. The Office of Defense Mobilization is now studying the steel industry's expansion program in its entirety. One steel official says it is the only practical way to boost capacity. But it's a political football. If the administration says O.K., the opposition may label it a "government giveaway." If it reneges, the administration could be charged with breaking faith with the intent of the roadbuilding bill. There's a chance ODM will make its report before election time.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 237

Concrete reinforcing bar lettings are heavy. So are order backlogs. But some slight improvement in supply is reported, reflecting resumption of full mill operations following the steel strike. Distributors are booking orders for delivery as far ahead as mid-1957.

Steel piling is reported in critical supply. No bids were received on 11,400 tons of steel H-beam piles, for the Board of Commissioners, New Orleans. A German mill is low on 1700 tons of sheet

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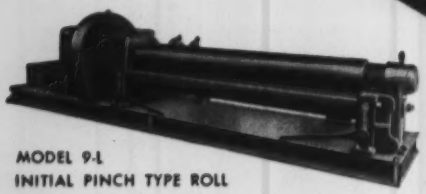

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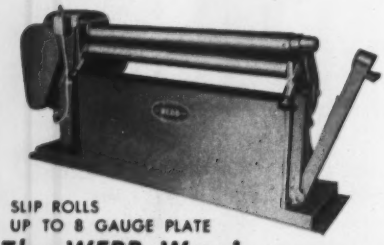

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piling, but is quoting on only part of the inquiry.

Oregon Steel Mills resumed full operations Sept. 8, following shutdown for overhaul and maintenance work since Aug. 15.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 238 & 239

With carry-over tonnage sure to be heavy at the end of the current quarter, six weeks and more in some instances are being blanked out of fourth quarter production schedules on hot and cold-rolled sheets. Producers are moving carefully in accepting new commitments until they know more definitely what automotive requirements will be.

Hot-rolled sheets are in greater stringency than cold-rolled, due in part to the character of demand, which, in the East is particularly noticeable in containers, light tanks and various conversion needs. Domestic tank demand is seasonally active.

Some mills report shortages at the ingot level are contributing substantially to the tightness in hot-rolled sheet supply. Restricted openings in hot-rolled schedules for fourth quarter, from mid-November through December, are being rapidly filled. Heavier buying on automotive account is tightening cold-rolled supplies.

Galvanized sheet orders are inclined to drag. Most users and distributors have large inventories. Electrical sheets, transformer grade, are slower, and tonnage can be placed for November shipment.

Steel Bars . . .

Bar Prices, Page 237

Barmakers still don't know what automotive requirements they can count on for rolling over the remainder of this year. They are opening their fourth quarter books cautiously.

One leading interest has opened books for the period, but is accepting tonnage only for December. If auto needs fall short of anticipations, this seller may have a little more tonnage to offer on the market.

Other mills are offering tonnage almost as sparingly. So far as can be learned, few mills are promising deliveries against new orders before mid-November. Most will not accept orders for October shipment, and will take only 50 per cent of normal November volume. The extent of carry-over into October will govern the tonnage available for new business in November and beyond.

Hot-rolled alloy bars, barring nickel specialties, can be placed for December rolling, with shipments ranging six to seven weeks on most sizes.

Tubular Goods . . .

Tubular Goods Prices, Page 241

Sales of tubular products are slow in scattered areas — mainly small-diameter pipe used in the construction of houses and buildings. Household requirements for pipe are not as heavy as they have been in recent past years.

Demand remains heavy in other pipe consuming fields, especially from the oil, gas and boiler indus-

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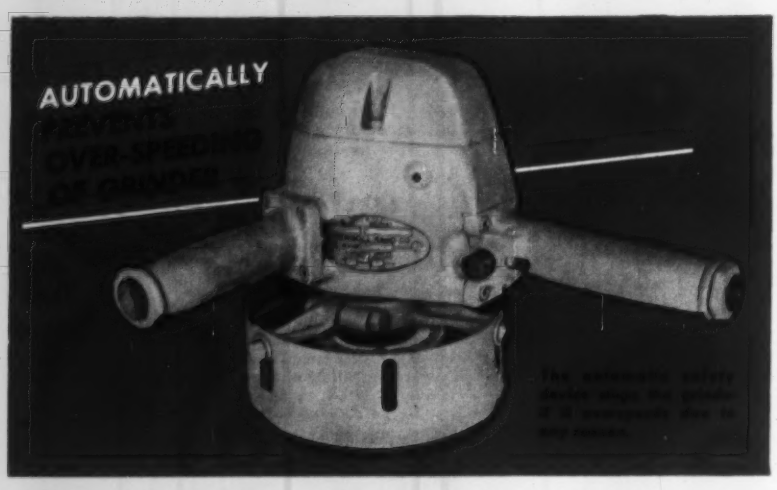

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tries. Demand for large-diameter pipe is expected to stay strong for at least another year on the basis of orders already booked.

Tin Plate . . .

Tin Plate Prices, Page 239

Tin mill product price bases will be advanced 10 cents per base box for the Nov. 1, 1956, through Apr. 29, 1957, pricing period.

The increase, announced by U.S. Steel Corp. and its general operating divisions, Columbia-Geneva Steel and Tennessee Coal & Iron, is in line with trade expectations. It's on electrolytic and hot-dipped tin plate, black plate and terne plate. Other producers are expected to announce like advances before the Nov. 1 effective date.

On Apr. 30 this year, prices were raised 40 cents per base box. After a review of costs, an additional increase is found necessary to offset higher labor costs. The revision will amount to slightly more than 1 per cent of current prices.

Plates . . .

Plate Prices, Page 237

Plate consumers generally will not get tonnage at prestrike levels before the end of this month because of the mill arrearages in government-rated work. Even then, tonnage will fall far short of requirements, owing to the volume lost during the strike and the large amount of new work that has developed, such as tanks, line pipe, construction, heavy equipment fabrication and shipwork.

Freight car awards are light, but the car shops have substantial backlogs and are unable to obtain sufficient steel tonnage to work them off with any degree of dispatch. There is considerable pressure on the plate mills from that area of the consuming market. They are getting tonnage more in line with adjusted shop operations.

Japanese plates were offered recently in Seattle at $215-$220 a ton, but this price was too high to even interest importers. Recently, 10,000 tons of Chilean plates were imported for west coast distribution.

Shipyard backlogs are gradually mounting. Submarines, missile and specialized vessels are scheduled to be placed this fall. Maryland Ship-

building & Dry Dock Co., Baltimore, has a contract for a 20,000-ton tanker, bringing its backlog to $30 million.

Wire . . .

Wire Prices, Pages 239 & 240

With farm product prices strengthening, the outlook for merchant wire demand is promising. One midwest wiremaker reports its 1956 sales of fencing and other agricultural wire items should equal, possibly top, the 1955 figures. First half sales were about equal to those in the comparable 1955 period. This fall's business is expected to better last fall's totals.

Tool Steel . . .

Tool Steel Prices, Page 241

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 13,149 net tons in June, reports the American Iron & Steel Institute. This is exclusive of 214 tons shipped to members of the industry for conversion or resale. In May, net shipments were 12,730 tons, and in June, 1955, they totaled 11,854 tons.

Net shipments in the first half of this year amounted to 70,695 net tons, of which 10,570 were class A high speed steels; 2019 tons were class B high speed steels; and 59,448 tons were other tool steels including, all hot-work steel; high chromium (4 per cent min.) die steels; all other alloy tool steels; carbon tool steels, excluding hollow drill steel.

In the first six months of 1955 shipments totaled 57,141 tons, of which 10,144 were class A high speed steels; 1684 tons were class B high speed steels, and 46,062 tons, other tool steels.

Screwmaker Adopts Net Pricing

Cleveland Cap Screw Co., Cleveland, established a schedule of net pricing for its line of hexagon head capscrews effective Sept. 4. In abandoning list prices and discounts, the company feels it will reduce order errors and save jobbers and end users more than 10 per cent of their pricing time on fasteners.

The system is similar to that adopted by another large bolt and nut manufacturer last month (see STEEL, Aug. 27, p. 118), establish-

15,000

3/4" bolts uniformly tightened to 60 ft. lbs.

TORSION BAR

with new Ingersoll-Rand

Torque Control IMPACTOOL

PROBLEM:	Assembly of 1390 mechanical pipe joints involved over 15,000 3/4" bolts. The problem was to speed assembly, remove guesswork and assure proper tightness of all joints.
AIR ENGINEERING SOLUTION:	A new Ingersoll-Rand Size 5040T Torsion Bar Torque Control Impactool, preset to deliver 60 ft. lbs., was put on the job.
RESULT:	The Torque Control Impactool automatically shut off at the preset Torque all guesswork was eliminated . . uniform joint tightness was produced . . . an average of 10 minutes per joint was saved . . . smaller bell holes were required due to compact size of the 5040T this one tool produced an extra profit of $404.25 on this job.

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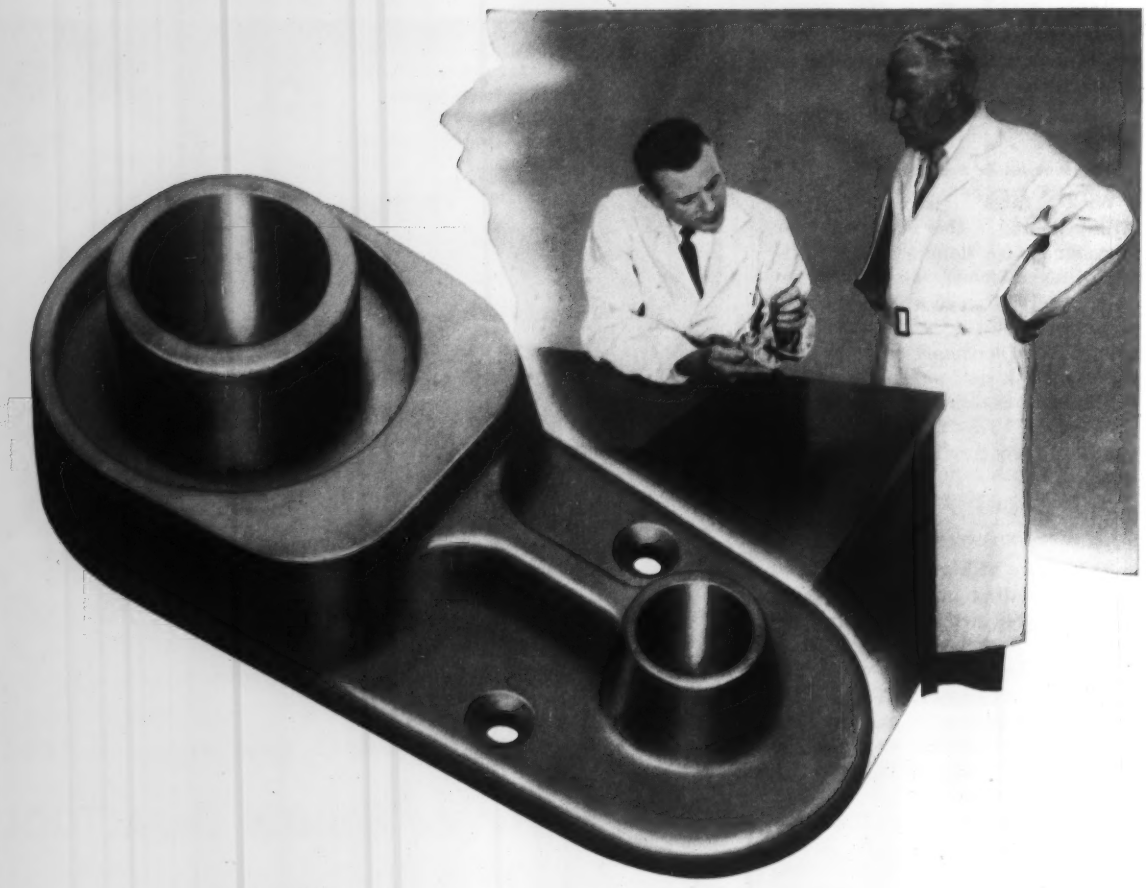

They said it couldn't be spray-painted AUTOMATICALLY

. . . but DeVilbiss automatics are spraying this complex part—with a fully-covering, uniform finish!

The deep recesses, irregular contours, and compound forms of this 4-inch die casting would ordinarily rule out automatic painting.

In fact, uniformly coating its internal and external corners, cylindrical as well as flat areas—in at least six different planes—presents a problem that finishing experts find difficult to do, even by hand.

Yet, today, a DeVilbiss automatic spray machine is doing the job to perfection, attaining, in one coat, a high-lustre finish which rivals most two-coat finishes.

Solving a problem like this—which other spray methods are unable to handle—is a regular occurrence with DeVilbiss. It takes more than ordinary spray equipment. It's the full knowledge of materials, production methods, and spray techniques—combined with the most versatile automatic spray equipment available—that enables DeVilbiss to bring remarkable savings to its customers, and attain quality finishes on components of any size or shape.

Why not let us test run your product under simulated plant conditions in our customer lab? We'll report actual costs, plus projected savings over your present system . . . without obligation. Our nearest representative will gladly make arrangements for you now.

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ing quantity brackets and a 2 per cent discount for payment of invoices within ten days. Prices in the new schedule are up an average of 8 per cent, reflecting current steel and labor costs, the company says.

Steel Shipments Set Record

Finished steel product shipments of 46,933,786 net tons in the first six months of this year set a record, reports the American Iron & Steel Institute. This was more than 4.9 million tons greater than the 41,990,159 tons moved in the corresponding period of 1955.

June shipments amounted to 8,077,805 net tons, compared with 7.7 million in May and 7.8 million in June a year ago.

During the second quarter, shipments totaled 23,626,513 tons, against 22,591,844 in the like period of 1955.

First half shipment records included:

Warehouses and distributors received over 9.2 million tons from the mills, equal to 20.5 per cent of total domestic shipments. This compares with 18.9 per cent in the first half of last year.

Construction received over 5.5 million tons. This was 12.3 per cent of domestic shipments, against 11.4 per cent in the first half of last year. Contractors' products received 2.3 million tons, 5.2 per cent, against 4.7 per cent a year ago.

Other first half records included oil and gas drilling (462,346 tons); machinery (2,827,215); electrical machinery (1,354,455).

First half records were set in wire rods (635,024 tons); heavy shapes (2,823,017); steel piling (213,526); reinforcing bars (1,306,848); pipe and tubing (5,672,808); drawn wire (1,743,508); electrolytic tin plate (2,779,824); cold-rolled sheets (7,643,827); galvanized sheets (1,652,181); electrical sheets and strip (455,460); total sheets and strip (16,731,586 tons).

Shipments to the auto industry were 8,021,305 tons, or 17.9 per cent of the total, compared with 9,612,069, 23.9 per cent, in the first half of last year.

FINISHED STEEL PRODUCT SHIPMENTS—JUNE, 1956
(All Grades, Net Tons)

Products	Carbon	Alloy	Stainless	Year To Date 1956	Year To Date 1955
Ingots	36,038	17,585	56,310	404,615	278,656
Blooms, etc.	163,594	53,092	3,333	1,323,341	1,406,339
Tube rounds	6,488	471	22	10,000	NA
Skelp	19,050	.....	.....	100,826	85,427
Wire rods	112,400	1,890	569	635,024	577,355
Structural shapes	491,427	5,828	6	2,823,017	2,271,119
Steel piling	41,078	.....	.....	213,526	182,542
Plates	697,087	52,595	4,167	4,159,832	3,170,657
Rails (standard)	100,083	.....	.....	671,486	650,781
Rails (all other)	6,041	.....	.....	53,479	37,309
Joint bars	7,422	.....	.....	50,463	34,545
Tie plates	28,314	.....	.....	184,538	168,642
Track spikes	12,152	.....	.....	63,923	50,310
Wheels (rolled & forged)	32,657	111	.....	186,353	145,067
Axles	16,204	59	.....	93,727	53,740
Bars (hot-rolled)	649,263	169,762	6,711	4,982,655	4,310,133
Bars (reinforcing)	274,755	.....	.....	1,306,848	1,013,619
Bars (cold-drawn)	137,736	29,956	6,216	1,039,220	928,155
Tool steel	1,970	11,179	.....	70,695	57,141
Standard pipe	315,602	9	.....	1,639,942	1,431,698
Oil country goods	178,834	45,306	.....	1,426,082	1,238,562
Line pipe	331,986	1	.....	1,864,213	1,375,277
Mech. tubing	67,449	23,524	482	545,292	469,170
Pressure tubing	29,174	6,224	1,833	197,279	130,811
Wire (drawn)	320,172	5,065	3,283	1,743,508	1,604,833
Nails & Staples	72,250	.....	.....	331,861	360,414
Wire (barbed)	10,162	.....	.....	55,290	85,336
Woven wire fence	34,747	.....	.....	184,829	210,102
Bale ties	11,010	.....	.....	37,197	37,260
Black plate	74,376	.....	.....	457,939	413,766
Tin Plate (HD)	84,371	.....	.....	565,376	611,171
Tin Plate (electrolytic)	466,060	.....	.....	2,779,824	2,546,027
Sheets (HR)	782,580	31,385	2,513	4,905,372	4,674,711
Sheets (CR)	1,257,703	4,504	14,899	7,643,827	7,456,182
Sheets (galvanized)	279,057	1	.....	1,652,181	1,371,061
Sheets (other coated)	23,288	.....	.....	137,272	131,461
Sheets (enameling)	Not Available: Included in Cold-Rolled Sheets.				105,717
Electrical sheets & strip	13,595	66,486	.....	455,460	389,316
Strip (HR)	172,816	3,335	382	1,028,568	1,068,176
Strip (CR)	120,697	2,061	20,585	908,906	857,571
Total (1956)	7,479,688	530,429	67,688	46,933,786	.....
Total (1955)	7,217,242	487,627	65,344	.....	41,990,159

Data from American Iron & Steel Institute.
NA: not available.

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An air compressor that runs well can fool you into thinking that it works well, too. Fact is, it may be "running" your compressed-air costs way out of proportion because it has lost its efficiency. And that means you're paying for a *new* compressor through higher electric bills!

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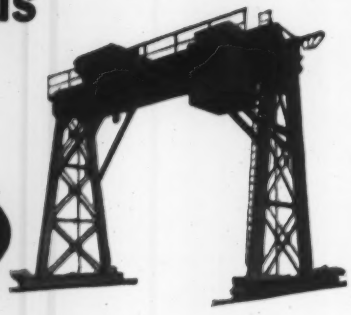

such as this one rather than to build an expensive runway; or on a half gantry crane with one end of the bridge traveling on a runway attached to the building.

As a result of Euclid's long service to industry many manufacturers have formed the habit of coming to this company for advice as to the size and type of crane or hoist best adapted to their requirements.

The Euclid line is extensive — including units for practically all conventional needs. Euclid experience has also covered the developing of equipment for various unusual needs.

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Imported Steel Prices Rise

Imported steel prices continue to advance, in some cases soar, where nearby deliveries are available. H-columns have been sold up to $12.50 per 100 lb, landed, duty paid. Open-hearth plates in the heavier gages are $10 and $11. These prices represent special premiums for material afloat, most through speculative operations, and available for delivery within ten days or so. Especially high prices are being offered for pipe skelp for early shipment.

Where nearby deliveries are not available, prices have increased more moderately. Western continental European countries have increased their prices from 5 to 65 cents per 100 lb on products for extended shipment. Exceptions are sheets, bands and wire rods, which are unchanged.

At the more moderate prices, bessemer plates are available for first quarter delivery, open-hearth plates for second quarter. Merchant bars can be had in four months; deformed bars, three to four months; structurals, first quarter and beyond; sheet piling, about six months; hot and cold sheets, two to three months and most wire products, ten weeks.

Warehouse . . .

Warehouse Prices, Page 242

The supply of products with two exceptions (sheet and strip) is tightening. Plate and structural shape supplies will not be enough to meet a fraction of demand, and no relief is in sight. Suppliers of most steel products are not accepting orders for delivery in October and early November.

Demand for cold-finished and hot-rolled bars, is heavier, and supplies likely will stay fairly tight for the rest of the year. Sheet supply remains good, and most distributors say they are certain of being able to fill all their fourth quarter orders. Deliveries from mills returned to normal more quickly than had been expected. No emergency orders are being received from customers who usually buy from mills.

Bookings by distributors are heavier, with product demand well distributed. September volume should show an increase over August. For the year as a whole,

business must be classed as good; some distributors estimate that 1956 business will be nearly 20 per cent above 1955.

August Steel Recovery Sharp

Production of ingots and steel for castings in August totaled 8,148,000 net tons, reports the American Iron & Steel Institute. This compares with 1,622,163 tons in July, when the industry was strikebound.

The total output for eight months this year was 72,377,774 net tons. This compares with 75,-901,793 in the like period last year. Prior to the strike in July, output for the first half was about 5.4 million tons greater than in the first six months of 1955.

During August, the steelmaking furnaces were operated at an average of 74.7 per cent of the Jan. 1, 1956 capacity, rated at 128,363,090 tons. This compares with 14.9 per cent in July, and 92.1 per cent in June. The average for the first eight months of this year was 84.3 per cent.

The index of steel production (1947-49 equals 100) was 114.5 in August, 22.8 in July and 141.2 in June. Details are given in the accompanying table.

Structural Shapes . . .

Structural Shape Prices, Page 237

While structural orders are relatively light, inquiry is mounting. Several sizable jobs are actively before the market.

In the New York area, more state bridgework is up for figures Sept. 27, including projects in Monroe, Rensselaer and Queens counties.

The largest structural fabricating shops in the area are booked 12 to 15 months ahead, and beyond in at least one instance. The smaller shops have backlogs sufficient to carry them eight months on the average. In all cases, some tonnages can be worked in earlier if specifications are especially favorable.

Meanwhile, fabricators are recovering somewhat from the severe stringency in plain material caused by the steel strike. Their inventories, however, are far from balanced, and fabricators look for a tight situation for some months to come in both shapes and plates.

Pig Iron . . . .

Pig Iron Prices, Page 242

Wheeling Steel's No. 2 blast furnace at Steubenville, O. has resumed operation after being down

(*Please turn to page* 246)

Period	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cetn of capacity
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
*June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
*2nd. Qtr. .	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
*1st 6 Mo	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
*July	1,330,151	13.9	.....	...	292,012	30.5	1,622,163	14.9
†August ..	7,215,000	75.6	190,000	46.7	743,000	77.7	8,148,000	74.7
1955								
January ..	8,054,345	86.0	199,229	49.0	584,162	63.6	8,837,736	82.7
February .	7,734,884	91.5	197,091	53.7	564,959	68.1	8,496,934	88.0
March	9,060,026	96.7	255,493	62.8	666,235	72.6	9,981,754	93.4
1st Qtr. ..	24,849,255	91.4	651,813	55.2	1,815,356	68.1	27,316,424	88.0
April	8,858,549	97.7	275,069	69.8	681,477	76.6	9,815,095	94.8
May	9,307,291	99.4	305,347	75.1	715,678	77.9	10,328,316	96.6
June	8,764,430	96.6	283,544	72.0	698,493	78.6	9,746,467	94.1
2nd Qtr. ..	26,930,270	97.9	863,960	72.3	2,095,648	77.7	29,889,878	95.2
1st 6 Mos.	51,779,525	94.7	1,515,773	63.8	3,911,004	72.9	57,206,302	91.6
July	8,232,535	88.1	268,348	66.1	600,063	65.5	9,100,946	85.3
August	8,600,612	91.8	298,972	73.5	694,961	75.7	9,594,545	89.7
September .	8,829,266	97.6	307,171	78.2	745,888	84.1	9,882,325	95.7
3rd Qtr. ..	25,662,413	92.4	874,491	72.6	2,040,912	75.0	28,577,816	90.2
9 Mos.	77,441,938	93.9	2,390,264	66.8	5,951,916	73.6	85,784,118	91.1
October ...	9,369,704	100.0	330,150	81.2	801,196	87.3	10,501,050	98.2
November .	9,141,244	100.8	306,674	77.9	799,480	89.9	10,247,398	99.0
December .	9,406,531	100.7	292,429	72.1	804,559	87.8	10,503,519	98.5
4th Qtr. ..	27,917,479	100.5	929,253	77.0	2,405,235	88.3	31,251,967	98.6
Last Half .	53,579,892	96.5	1,803,744	74.8	4,446,147	81.7	59,829,783	94.4
Total 1955	105,359,417	95.6	3,319,517	69.3	8,357,151	77.3	117,036,085	93.0

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,154,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,-363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,-828,310 net tons.

*Revised. †Preliminary figures subject to revision

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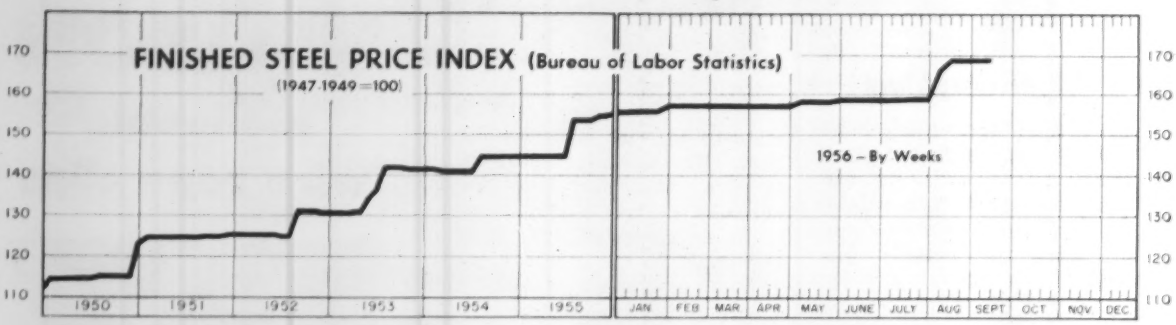
Price Indexes and Composites



Sept. 11, 1956	Week Ago	Month Ago	Aug. Avg.	Year ago
168.6	168.6	168.6	168.6	153.9

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 11

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
Tubes, Boiler (100 ft)	45.033	Black Plate, Canmaking Quality	7.133
Tubing, Mechanical, Carbon (100 ft)	22.973	Wire, Drawn, Carbon	9.175
Tubing, Mechanical, Stainless, 304 (100 ft)	187.133	Wire, Drawn, Stainless, 430 (lb)	0.630
Tin Plate, Hot-dipped, 1.25 lb	9.333	Bale ties (bundle)	7.213
Tin Plate, Electrolytic, 0.25 lb	8.033	Nails, Wire, 8d Common	9.368
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 12 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.71	225.71	225.71	207.63	171.92
Index in cents per lb	6.114	6.114	6.114	5.625	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$137.75	$137.75	$137.75	$127.41	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	59.67	58.83	56.67	44.33	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 12 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld. Philadelphia	5.00	5.00	5.00	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.50	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25-6.45	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.35-6.45	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.35	8.35	8.35	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.85	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Sept. 12 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld. Phila.	66.26	66.26	66.26	59.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	59.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$58.50	$58.50	$54.00	$43.00	$45.00
No. 1 Heavy Melt, E. Pa.	59.00	59.00	57.00	46.50	43.50
No. 1 Heavy Melt, Chicago	61.50	59.00	59.00	42.00	43.50
No. 1 Heavy Melt, Valley	65.50	65.50	64.50	46.50	45.00
No. 1 Heavy Melt, Cleve.	63.00	63.00	62.00	44.00	44.00
No. 1 Heavy Melt, Buffalo	56.50	56.50	54.50	38.50	44.00
Rails, Rerolling, Chicago	84.50	83.50	80.50	64.50	52.50
No. 1 Cast, Chicago	53.50	53.50	53.50	46.50	49.00

COKE, Net Ton					
Beehive, Furn. Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers page 238; to footnotes, page 240.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $74.00
Houston 85 ..... 74.00
Midland,Pa. C18 ..... 74.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$74.00
Bessemer,Pa. U5 ..... 74.00
Bridgeport,Conn. N19 .. 79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 ..... 74.00
Fontana,Calif. K1 ... 83.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 .... 74.00
Lackawanna,N.Y. B2 .. 74.00
LoneStar,Tex. L6 .... 74.50
Munhall,Pa. U5 ..... 74.00
Pittsburgh J5 ..... 74.00
S.Chicago,Ill. R2, U5 .. 74.00
S.Duquesne,Pa. U5 .... 74.00
Sterling,Ill. N15 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$91.50
Bessemer,Pa. U5 ..... 91.50
Bridgeport,Conn. N19 .. 96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 .. 96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 .... 101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston 85 ..... 96.50
Johnstown,Pa. B2 .... 91.50
Lackawanna,N.Y. B2 .. 91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 91.50
Munhall,Pa. U5 ..... 91.50
Pittsburgh J5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 .... 91.50
S.SanFrancisco B3 .. 101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19 .107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 ..... 107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 ..... 107.00
Houston 85 ..... 112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 .... 107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 ..... 107.00
Midland,Pa. C18 ..... 107.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland R2 ..... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 111.50
S. Duquesne,Pa. U5 ..111.50

SKELP

Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 ....4.625
SparrowsPoint,Md. B2 .4.625
Warren,O. R2 ....4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.80
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Houston 85 ..... 6.05
IndianaHarbor,Ind. Y1 .. 5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. S5 .... 6.05
Kokomo,Ind. C16 ..... 5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P7 ..... 5.80
N.Tonawanda,N.Y. B11.5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 .. 5.90
Sterling,Ill.(1) N15 .... 5.80
Sterling Ill. N15 ..... 5.90
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 .... 6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.30
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala. T2 ..... 5.00
Fontana,Calif. K1 .... 5.70
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston 85 ..... 5.10
Ind.Harbor,Ind. I-2 .... 5.00
Johnstown,Pa. B2 ..... 5.05
KansasCity,Mo. S5 .... 5.10
Lackawanna,N.Y. B2 .. 5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 .... 5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 .... 5.85
Portland,Oreg. O4 ..... 5.80
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14 .. 5.00
S.SanFrancisco B3 .... 5.65
Sterling,Ill. N15 ..... 5.00
Torrance,Calif. C11 .... 5.70
Weirton,W.Va., W6 .... 5.00

Wide Flange

Bethlehem,Pa. B2 ..... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 .... 5.85
IndianaHarbor,Ind. I-2 .. 5.00
Lackawanna,N.Y. B2 .. 5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 .... 5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Clairton,Pa. U5 ..... 6.20
Fontana,Calif. K1 .... 7.85
Gary,Ind. U5 ..... 6.20
Houston 85 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clairton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 .... 8.05
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston 85 ..... 7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 .... 7.45
Lackawanna,N.Y. B2 .. 7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14 .. 7.35
S.SanFrancisco B3 .... 8.00
Struthers,O. Y1 ..... 7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Ind.Harbor,Ind. I-2 .... 7.35
Lackawanna,N.Y. B2 .. 7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2.... 4.65
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.90
Lackawanna,N.Y. B2 ...5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago,Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky. (15) A10 .. 4.85
Bessemer,Ala. T2 ..... 4.85
Bridgeport,Conn. N19 .. 4.75
Clairton,Pa. U5 ..... 4.85
Claymont, Del. C22 .... 5.35
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 .... 5.25
Conshohocken,Pa. A3 .. 4.90
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 .. 5.55
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 .... 5.05
Harrisburg,Pa. P4 ..... 5.80
Houston 85 ..... 4.95
Ind.Harbor,Ind. I-2, Y1 .4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 .. 4.85
LoneStar,Tex. L6 ..... 4.85
Minnequa,Colo. C10 .... 5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. N9 ..... 4.85
Pittsburgh J5 ..... 4.85
Riverdale,Ill. A1 ..... 4.85
Seattle B3 ..... 5.75
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14 .. 4.85
SparrowsPoint,Md. B2 .. 4.85
Steubenville,O. W10 .... 4.85
Warren,O. R2 ..... 4.85
Weirton,W.Va. W6 .... 4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .... 6.20
Fontana,Calif. K1 .... 6.70
Geneva,Utah C11 ..... 6.00
Johnstown,Pa. B2 ..... 5.65
SparrowsPointMd. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 .... 11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont,Del. C22 .... 7.55
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 .... 7.55
Conshohocken,Pa. A3 .. 7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1 .. 7.95
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston 85 ..... 7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14 .. 7.25
SparrowsPoint,Md. B2 .. 7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 .... 7.25

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 .... 6.85
Coatesville,Pa. L7 .... 6.85
Fontana,Calif.(30) K1 .. 7.55
Gary,Ind. U5 ..... 6.85
Houston 85 ..... 6.95
Ind.Harbor,Ind. Y1 ... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. N9 ..... 6.85
Seattle, B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14 .. 6.85
SparrowsPoint,Md. B2 .. 6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 .. 5.925
Harrisburg,Pa. P4 .... 6.275
Ind.Harbor,Ind. I-2.... 5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 ..... 5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10 5.10
Ashland l.c.l. (15) A10.. 5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa(9) J5 ...5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.575
Bessemer,Ala.(9) T2 ...5.075
Birmingham(9) C15 ...5.375
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa. U5 ..... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 ...5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ...5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 ..... 5.075
Geneva(9) C11 ..... 5.175
Houston(9) 85 ..... 5.325
Ind.Harbor(9) I-2, Y1 .5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 ..... 5.575
KansasCity,Mo.(9) S5 .5.325
Lackawanna(9) B2 .... 5.075
LosAngeles(9) B3 .... 5.775
Midland,Pa.(9) C18 ..... 5.425
Milton,Pa.(23) M18 ..5.425
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 ..... 5.85
N.T'wanda,N.Y.(9)B11 5.075
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .... 5.075
Portland,Oreg. O4 .... 5.85
Seattle B3, N14 ..... 5.825
S.Ch'g'o(9) R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 .5.075
S.SanFran.,Calif.(9) B3 .5.825
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Torrance,Calif.(9) C11.5.775
Weirton,W.Va.(9)W6 ..5.075
Youngstown(9) R2, U5 .5.075

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 6.125
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 .... 7.175
Gary,Ind. U5 ..... 6.125
Houston 85 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.125
Johnstown,Pa. B2 ..... 6.125
KansasCity,Mo. S5 .... 6.375
Lackawanna,N.Y. B2 .. 6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 6.125
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 .... 6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.425
Bessemer,Ala. T2 ..... 7.425
Bethlehem,Pa. B2 ..... 7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 ..... 7.425
Fontana,Calif. K1 .... 8.125
Gary,Ind. U5 ..... 7.425
Houston 85 ..... 7.675
Ind.Harbor,Ind. Y1 ... 7.425
Johnstown,Pa. B2 ..... 7.425
KansasCity,Mo. S5 .... 7.675
Lackawanna,N.Y. B2 .. 7.425
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Seattle B3 ..... 8.175
S.Chicago U5, W14 .... 7.425
S.Duquesne,Pa. U5 .... 7.425
S.SanFrancisco B3 .... 8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Lackawanna(9) B2 .... 5.075
Sterling,Ill. N15 ..... 5.175
Sterling,Ill.(1) N15 .... 5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ....5.075
Atlanta A11 ..... 5.575
Fontana,Calif. K1 .... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.85
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston 85 ..... 6.45
KansasCity,Mo. S5 .... 6.45
Youngstown U5 ..... 6.20

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 .... 9.225
Chicago W18 ..... 9.225
Cleveland C20 ..... 8.325
LosAngeles $30 ..... 10.60
Monaca,Pa. S17 ..... 9.225
Newark,N.J. W18 ..... 9.40
SpringCity,Pa. K3 .... 8.30
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 6.85
BeaverFalls,Pa. M12,R2.6.85
Bridgeport,Conn. N19 ..7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.85
Chicago W18 ..... 6.85
Cleveland A7, C20 ..... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.85
Donora,Pa. A7 ..... 6.85
Elyria,O. W8 ..... 6.85
FranklinPrk,Ill. N8 .... 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 .... 6.85
Hammond,Ind. L2, M13. 6.85
Hartford,Conn. R2 .... 7.35
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) $30 .... 8.30
LosAngeles R2 ..... 8.30
Mansfield,Mass. B5 .... 7.40
Massillon,O. R2, R8 .. 6.85
Midland,Pa. C18 ..... 6.85
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 .. 6.85
Pittsburgh J5 ..... 6.85
Plymouth,Mich. P5 .... 7.10
Putnam,Conn. W18 .... 7.40
Readville,Mass. C14 .... 7.40
S.Chicago,Ill. W14 .... 6.85
SpringCity,Pa. K3 .... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F3, Y1 .... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R28.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 8.325
Chicago W18 ..... 8.325
Cleveland A7, C20 .... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 8.325
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 8.325
FranklinPark,Ill. N8 ..8.325
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 .... 8.325
Hammond,Ind. L2,M13.8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles $30 ..... 10.10
Mansfield,Mass. B5....8.625
Massillon,O. R2, R8 ..8.325
Midland,Pa. C18 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ....8.50
Plymouth,Mich. P5 ...8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 ....8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 ..8.625
Youngstown F3, Y1 ..8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.575
Birmingham C15 ..... 5.375
Bridgeport,Conn. N19 ..5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich. G5 ..... 5.425
Emeryville,Calif. J7 ....5.85
Fairfield,Ala. T2 ..... 5.075
Fairless,Pa. U5 ..... 5.225
Fontana,Calif. K1 ..... 5.80

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 ....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3 .4.725
Detroit(8) M1 ....4.775
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 ....4.775
Fairfield,Ala. T2 ....4.675
Fairless,Pa. U5 ....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 ....4.675
Geneva,Utah C11 ....4.775
GraniteCity,Ill.(8) G4 ..4.875
IndHarbor, Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 ....4.675
Newport,Ky.(8) N9 ..4.675
Niles,O. M21 ....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 ....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 ....4.675
Sharon,Pa. S3 ....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 ..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 ....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 ga. & Lighter)

Niles,O. M21 ....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 ....7.75
Ind.Harbor,Ind. Y1 ...7.75
Newport,Ky. N9 ....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 ....7.00
Fairfield,Ala. T2 ....6.90
Fairless,Pa. U5 ....6.95
Fontana,Calif. K1 ....7.70
Gary,Ind. U5 ....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 ....6.90
Pittsburgh J5 ....6.90
S.Chicago,Ill. U5 ....6.90
SparrowsPoint(36) B2 6.90
Warren,O. R2 ....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ..6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 ....5.425
Ind.Harbor,Ind. I-2 ....4.925
Warren,O. R2 ....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ....5.75
Cleveland J5, R2 ....5.75
Conshohocken,Pa. A3 ...5.80
Dravosburg,Pa. U5 ....5.75
Detroit M1 ....5.75
Ecorse,Mich. G5 ....5.85
Fairfield,Ala. T2 ....5.75
Fairless,Pa. U5 ....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 ....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 ....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 ....5.75
Pittsburg,Calif. C11 ..6.70
Pittsburgh J5 ....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 ....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 ....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Dravosburg,Pa. U5 ..8.525
Ecorse,Mich. G5 ....8.625
Fairless,Pa. U5 ....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 ....8.525
IndianaHarbor,Ind. Y1.8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 ....8.525
SparrowsPoint(38) B2 8.525
Warren,O. R2 ....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 ....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 ....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
Ind.Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg U5 ....6.90
Gary,Ind. U5 ....6.90
Ind.Harbor,Ind. I-2 ...6.90
MartinsFry.O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ....6.30‡
Ashland,Ky. A10 ....6.30†
Canton,O. R2 ....6.30‡
Dover,O. R1 ....6.30†
Dravosburg,Pa. U5 ....6.30†
Fairfield,Ala. T2 ....6.30†
Gary,Ind. U5 ....6.30†
GraniteCity,Ill. G4 ....6.50‡
Ind.Harbor,Ind. I-2 ..6.30†
Kokomo,Ind. C16 ....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 ....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 ....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ..9.275
SparrowsPoint(39) B2 9.275

SHEETS, Galvannealed Steel

Canton,O. R2 ....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 ....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 ....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1)8.95
Butler,Pa. A10 (type 2)9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.325
Cleveland R2 ....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 ....6.325
GraniteCity,Ill. G4 ...6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ...6.325
Niles,O. M21 ....6.325
Youngstown Y1 ....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.175
Ind.Harbor,Ind. I-2 ..8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 ....6.70
Mansfield,O. E6 ....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 ....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 ....5.075
Houston 85 ....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 ....5.575
KansasCity,Mo. 85 ..5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 ....5.775
Milton,Pa. M18 ....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 ....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 ....5.075
Portland,Oreg. 04 ....5.85
SandSprings,Okla. 85..5.575
Seattle B3 N14 ....5.825
S.Chicago R2 ....5.075
S.Duquesne,Pa. U5 ...5.075
S.SanFrancisco B3 ...5.825
SparrowsPoint,Md. B2 5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 ....5.175
Struthers,O. Y1 ....5.075
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 ....6.81
Cleveland U8 ....6.79
Johnstown,Pa. ¼-1" B2.6.73
KansasCity,Kans. 85 ..6.825
Marion,O. P11 ....6.15
New York U8 ....7.18
Pittsburgh U8 6.75
Seattle B3, N14 ....7.20
SparrowsPt. ¼-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 ....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) F5 ....5.60
Franklin,Pa.(3) F5 ....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O.(3) P11 ....4.65
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19.5.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ..12.305
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.
E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H7 Helical Tube Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div. Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
N1 National-Standard Co.
N2 National Supply Co.
N3 NationalTube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
T2 Tenn.Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet&Tube

Key To Producers

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.675
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.675
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg U5	7.75
Fontana,Calif. K1	9.65
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Fontana,Calif. K1	8.025
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.90
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. A7, D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y. (32) R6	6.85
Sharon,Pa. S3	6.85
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	8.40
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	10.00

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	...
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit, D2	8.05	9.90	12.70	15.10	...
Dearborn,Mich. D3	8.05	9.90	12.70	...	...
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn. (10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	...
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	...
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	...
New York W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y. (32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)	Up to 0.80c	0.81-1.05c	1.06-1.35c
Bristol,Conn. W1	16.80	20.65	...
Buffalo W12	16.80	...	...
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	...	...
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. W12	14.80	...	...
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	...
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	...
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville A10 (SP coils)	...	...	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*†	12.275*	...
IndianaHarbor,Ind. I-2, Y1	9.20†	10.35*	11.025*†	12.075*	...
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*†	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	...	...	...
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	...	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	...	...	18.50	19.00	19.50	...
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	...	...	...	...	...	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	...	...
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Harbor Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15

SparrowsPoint,Md. B2	7.50
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora, Pa. A7	7.20
Duluth,Minn. A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester, Mass. A7	7.50

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth,Minn. A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester J4	9.025
Worcester,Mass. A7, T6	9.025

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth,Minn. A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	*14.25*
Buffalo W12	14.15
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7,T6	14.45

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	*11.75*
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	*11.55*
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.35
Roebling,N.J. R5	11.85
SparrowsPt. B2	11.65
Struthers,O. Y1	11.35
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	*15.25*
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester A7, T6	11.05

NAILS, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	.167
Aliquippa,Pa. J5	.167
Atlanta A11	.169
Bartonville,Ill. K4	.169
Chicago,Ill. W13	.167
Cleveland A9	.173
Crawfordsville,Ind. M8	.169
Donora,Pa. A7	.167
Duluth,Minn. A7	.167
Fairfield,Ala. T2	.167
Houston,Tex. S5	.172
Jack'ville,Fla.(20) M8	.178
Johnstown,Pa. B2	.169
Joliet,Ill. A7	.167
KansasCity,Mo. S5	.172
Kokomo,Ind. C16	.169
Minnequa,Colo. C10	.172
Monessen,Pa. P7	.167
Pittsburg,Calif. C11	.186
Rankin,Pa. A7	.167
S.Chicago,Ill. R2	.167
SparrowsPt.,Md. B2	.169
Sterling,Ill.(1) N15	.167
Worcester,Mass. A7	.173
(To Wholesalers) per cwt)	
Galveston,Tex. D7	8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	.167
Aliquippa,Pa. J5	.167
Atlanta A11	.169
Bartonville,Ill. K4	.169
Crawfordsville,Ind. M8	.169
Donora,Pa. A7	.167
Duluth,Minn. A7	.167
Fairfield,Ala. T2	.167
Jack'ville,Fla.(20) M8	.178
Johnstown,Pa. B2	.169
Joliet,Ill. A7	.167
Kokomo,Ind. C16	.169
Minnequa,Colo. C10	.172
Monessen,Pa. P7	.167
Pittsburg,Calif. C11	.186
Rankin,Pa. A7	.167
S.Chicago,Ill. R2	.167
SparrowsPt.,Md. B2	.169
Sterling,Ill.(1) N15	.167
Worcester,Mass. A7	.173

TIE WIRE, Automatic Baler (14½ Ga.) (For 97 lb Net Box)

Coil No. 3150	
AlabamaCity, Ala. R2	$10.03
Bartonville,Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	10.03
Duluth,Minn. A7	10.03
Jacksonville,Fla. M8	10.58
Johnstown, Pa. B2	10.03
Joliet,Ill. A7	10.03
Kokomo,Ind. C16	10.13
LosAngeles B3	10.82
Minnequa,Colo. C10	10.28
Pittsburg,Calif. C11	10.81
S.Chicago,Ill. R2	10.03
S.SanFrancisco C10	10.81
SparrowsPt.,Md. B2	10.13
Sterling,Ill. N15	10.03
Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$10.35
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	10.35
Duluth,Minn. A7	10.35
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	10.35
Joliet,Ill. A7	10.35
Kokomo,Ind. C16	10.45
LosAngeles B3	11.15
Minnequa,Colo. C10	10.60
Pittsburg,Calif. C11	11.15
S.Chicago,Ill. R2	10.35
S.SanFrancisco C10	11.15
SparrowsPt.,Md. B2	10.45
Sterling,Ill. N15	10.35

Coil Interim

AlabamaCity,Ala. R2	$10.40
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	10.40
Duluth,Minn. A7	10.40
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	10.40
Joliet,Ill. A7	10.40
Kokomo,Ind. C16	10.50
LosAngeles B3	11.34
Minnequa,Colo. C10	10.65
Pitts.,Calif. C11	11.20
S.Chicago,Ill. R2	10.40
S.SanFrancisco C10	11.20
SparrowsPt.,Md. B2	10.50
Sterling,Ill. N15	10.40

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	.187**
Aliquippa,Pa. J5	.184‡
Atlanta A11	.193
Bartonville,Ill. K4	.193
Crawfordsville,Ind. M8	.193
Donora,Pa. A7	.187†
Duluth,Minn. A7	.187†
Fairfield,Ala. T2	.187†
Houston,Tex. S5	.192**
Jacksonville,Fla. M8	.198
Johnstown,Pa. B2	.191*
Joliet,Ill. A7	.187†
KansasCity,Mo. S5	.192**
Kokomo,Ind. C16	.189†
Minnequa,Colo. C10	.192**
Monessen,Pa. P7	.191*
Pittsburg,Calif. C11	.207†
Rankin,Pa. A7	.187†
S.Chicago,Ill. R2	.187**
S.SanFrancisco C10	.207**
SparrowsPoint,Md. B2	.193*
Sterling,Ill.(1) N15	.191*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.181**
Aliq'ppa,Pa. 9-14½ga. J5	184‡
Atlanta A11	.187
Bartonville,Ill. K4	.187
Crawfordsville,Ind. M8	.187
Donora,Pa. A7	.181†
Duluth,Minn. A7	.181†
Fairfield,Ala. T2	.181†
Houston,Tex. S5	.186**
Jacksonville,Fla. M8	.192
Johnstown,Pa.(43) B2	.185
Joliet,Ill. A7	.181†
KansasCity,Mo. S5	.186**
Kokomo,Ind. C16	.183†
Minnequa,Colo. C10	.186**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	.204†
Rankin,Pa. A7	.181†
S.Chicago,Ill. R2	.181**
Sterling,Ill.(1) N15	.185*

	An'ld	Galv.
WIRE (16 Gage)	**Stone**	**Stone**
Ala.City R2	.16.10	17.65**
Bartonville K4	.16.10	18.05
Buffalo W12	.16.10	....
Cleveland A7	.16.10	....
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	.16.20	17.75†
Jacksonville M8	.16.45	18.40
Johnstown B2	.16.10	18.05*
Kokomo C16	.16.20	17.75†
Minnequa C10	.16.45	18.15**
P'im'r,Mass. W12	16.10	17.65*
Pitts.,Calif. C11	16.45	18.00†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	.16.10	17.65
Worcester A7	.16.40	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	8.10	8.50**
Aliquippa J5	.8.10	8.625‡
Atlanta A11	.8.20	8.80
Bartonville(48) K4	8.20	8.80
Buffalo W12	.8.10	8.50†
Cleveland A7	.8.10	....
Crawfordsville M8	.8.20	8.80
Donora,Pa. A7	.8.10	8.50†
Duluth,Minn. A7	.8.10	8.50†
Fairfield T2	.8.10	8.50†
Houston(48) S5	.8.35	8.75**
Jacks'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	8.10	8.70*
Joliet,Ill. A7	.8.10	8.50†
Kans.City(48) S5	8.35	8.75**
Kokomo C16	.8.20	8.60†
LosAngeles B3	.9.05	9.65*
Minnequa C10	.8.35	8.75**
Monessen P7 (48)	.8.10	8.70*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	.9.05	9.45†
Portsmouth,O. P12	8.10	....
Rankin,Pa. A7	.8.10	8.50†
S.Chicago R2	.8.10	8.50**
S.SanFran. C10	.9.05	9.45**
SparwsPt. B2(48)	8.20	8.80*
Str'ling(1)(48) N15	8.10	8.70*
Struth'rs,O.(48) T1	8.10	8.60‡
Worcester,Mass. A7	8.40	8.80†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop Col.

AlabamaCity,Ala. R2	.195
Atlanta A11	.197
Bartonville,Ill. K4	.197
Crawfordsville,Ind. M8	.197
Donora,Pa. A7	.195
Duluth,Minn. A7	.195
Fairfield,Ala. T2	.195
Jacksonville,Fla. M8	.202
Joliet,Ill. A7	.195
Houston S5	.200
KansasCity,Mo. S5	.200
Kokomo,Ind. C16	.197
Minnequa,Colo. C10	.200
Pitts.,Calif. C11	.199
S.Chicago,Ill. R2	.167
Sterling,Ill. N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth,Minn. A7	.167
Franklin,Pa. F5	.167
Huntington,W.Va. W7	.169
Johnstown,Pa. B2	.167
Marion,O. P11	.157
Minnequa,Colo. C10	.172
Moline,Ill. R2	.172
S.Chicago,Ill. R2	.167
Sterling,Ill. N15	.167
Tonawanda,N.Y. B12	.169
Williamsport,Pa. S19	.175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.... 55
Longer than 6 in. .. 46.5
⅝ in. thru 1 in.:
6 in. and shorter.... 46.5
Longer than 6 in. .. 44
1⅛ in. and larger:
All lengths 44
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter... 55

Carriage, Machine Lag Bolts
Hot Galvanized:
½ in. and smaller:
6 in. and shorter ... 35
Longer than 6 in. .. 23
⅝ in thru 1 in.:
6 in. and shorter .. 20
Longer than 6 in. .. 20
1⅛ in. and larger:
All lengths 20

Lag Bolts
All diameters:
6 in. and shorter..... 55
Longer than 6 in. 47

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 54
Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47
Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 59

Square Nuts, Reg. & .....

Heavy, Hot Galvanized:
All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:
⅝ in. and smaller.. 63
⅞ in. to 1 in. incl.. 59.5
1⅛ in. to 1½ in., incl. 64
1⅝ in. and larger... 58

Hex Nuts, Reg. & Heavy, Cold Punched:
⅝ in. and smaller.. 63
⅞ in. to 1⅛ in., incl. 59.5
1⅜ in. and larger.. 58

Hex Nuts, All Types, Hot Galvanized:
⅝ in. and smaller.. 50
⅞ in. to 1 in., incl. 46
1⅛ in. to 1½ in., incl. 51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. slotted):
⅝ in. and smaller.. 63
⅞ in. to 1⅛ in., incl. 59.5
1⅜ in. and larger.. 58

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller... 65
1⅛ in. to 1½ in., incl. 62
1⅝ in. and larger.. 58
(Base discounts, packages, per cent off list, f.o.b. mill)

CAP AND SET SCREWS

Hex Head Cap Screws, Coarse or Fine Thread Bright:
6 in. and shorter:
⅝ in. and smaller.. 47
⅞, 1⅛, and 1 in., diam. 31
Longer than 6 in.:
⅝ in. and smaller.. 18.5
⅞, 1⅛ and 1 in. diam. 55

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 34
⅞, 1⅛ and 1 in. diam. 13
Longer than 6 in.:
⅝ in. and smaller.. +1
⅞, 1⅛ and 1 in. diam. ..... +19

Fillister Head, Coarse Thread:
Listed Sizes ..... +31

Flat Head, Coarse Head:
¼ in. and smaller by 6 in. and shorter.. +57

Set Screws, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter .. 11
Longer than 6 in.... +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ⅛-in., larger 10.85
7/16-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2½	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All 60 lb No. 2	Tee Rails All 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	....(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	....(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

*Treated

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.23c; 1 15/16 to 8 in., inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.50c. for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+36	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		78.5c		92c		$1.09	
Pounds Per Ft	2.73		3.65		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	....	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	....	34.00	38.50	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.75	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	....	39.75	41.00	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.50	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	....	43.00	41.00	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.75	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.75	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.75	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.75	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.25	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.75	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	....	40.25	38.00	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	....	56.75	42.75	44.75	46.00	67.25	80.00

Stainless Steel Producers Are. Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	....	....	33.25
304	34.50	41.50	35.25
304-L	37.20	44.65	....
316	38.70	46.65	52.25
316-L	45.70	54.35	....
316-CB	45.90	54.75	....
321	36.35	43.40	42.00
347	39.50	48.45	51.00
405	29.20	37.05	....
410	28.70	36.55	....
430	28.70	36.55	....
Inconel	52.50	68.45	....
Nickel	44.10	58.65	....
Nickel, Low Carbon	46.30	63.15	....
Monel	47.00	62.55	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	33.60	41.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	....	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee deld.	64.80	65.30	65.30	65.80
Muskegon,Mich, deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
New York, deld.	....	69.01	69.51	....
Newark, deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks, deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	64.76	64.76	65.29
Verona,Trafford, deld.	64.79	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O. deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Phos. 0.70-0.90; intermediate (Phos. 0.31-0.50%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	*102.00*
Keokuk, O. H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	*105.00*

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09‡	15.69	8.57	8.12	9.56
Birmingham	7.68‖	8.88‖	8.85‖	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	10.92	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.70	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60‖‖	....	7.90	8.00	8.65	8.70‖‖	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.37
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.06
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.95	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	11.20	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.35	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.31	10.43	...	....	8.99	8.74	...	9.90	....	9.02	8.64	11.10

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **⅛-in. and heavier; ††as annealed; ‖42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 6000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; §—400 to 999 lb; ‖—1000 to 1999 lb; ¶—2000 to 3999 lb; ‖‖—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grann, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$32.50-33.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47% $1.10-1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash:

Indian and African

48% 3:1	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$35.00-36.00
44% no ratio	25.00-26.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked $1.18

Antimony Ore

Per unit of 8lb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f., Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	*24.00*
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb. drum frght. allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	*38.50-48.25†*
Bronze, 5000-lb lots	*59.50-63.00†*
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	*58.00-61.00†*
Phosphor-Copper, 5000-lb lots	*65.00*
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡

Tungsten:	Dollars
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.25-14.75
Connellsville, foundry	17.00-18.00

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N. J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N. J., ovens	28.75
Lone Star, Tex., ovens	29.50
Milwaukee, ovens	29.50
Neville Island (Pittsburgh), Pa., ovens	28.25
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	*28.50*
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	*$7.30*	*$7.30*	*$7.30*	*$7.70*
Bar Size Angles	*7.11*	*7.11*	*7.11*	*7.51*
Structural Angles	*7.50*	*7.50*	*7.50*	*7.90*
I-Beams	*7.75*	*7.75*	*7.75*	*8.15*
Plates	*9.55*	*9.55*	*9.55*	*9.95*
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ¼ x 0.30 lb per ft	*27.02*	*27.02*	*27.02*	*$0.98*
Barbed Wire (†)	*6.71*	*6.71*	*6.71*	*7.06*
Merchant Bars	*7.30*	*7.30*	*7.30*	*7.70*
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails	*8.05*	*8.05*	*8.05*	*8.35*

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $98.50; 19-21% Mn, 1-3% Si, $96; 16-19% Mn, $94.00.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridian, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 36.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si. 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D. $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c, less ton 32. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, cariot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D. $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

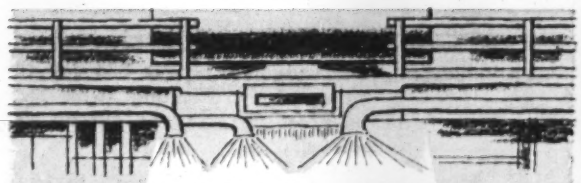
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



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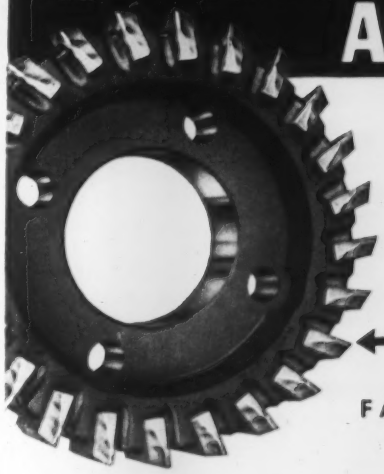

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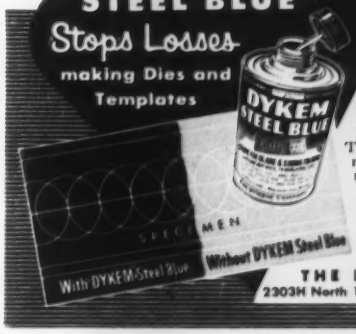

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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MORE THAN 90 YEARS' EXPERIENCE—YOUR GUARANTEE OF QUALITY AND SERVICE

(Concluded from page 235)

for relining since the end of June.

Merchant pig iron is moving freely, with most foundries operating five days a week, the normal schedule.

Consumers are buying mainly against current needs, making little effort to build up inventories which are equivalent to less than 30-day needs in most instances. Their order backlogs indicate that the melt will be sustained at the current high level through the rest of this year.

Some automotive foundries haven't experienced the influx of business that had been expected from the 1957 model production schedules.

Numerous inquiries have been received by Buffalo iron merchants from foreign interests who want to place orders for large tonnages at price concessions.

Canada . . .

Canadian production of iron and steel continues in record volume. Output of steel ingots in June was 455,588 net tons, against 462,131 in May and 389,268 in June, 1955.

Pig iron output in June amounted to 303,118 net tons, compared with 291,300 in May, and 275,049 in June, 1955.

Rails, Cars . . .

Track Material Prices, Page 240

A midwestern rail mill reports it is buying back rerolling rails from the railroads at better than twice the price it sold them for 25 years ago. In the early thirties, railroads paid about $36 for the rails. They're selling them back as rerolling stock at around $80 a ton.

Iron Ore . . .

Iron Ore Prices, Page 243

Lake Superior iron ore shipments totaled 2,687,627 gross tons in the seven-day period ended Sept. 10, reports the Lake Superior Iron Ore Association. This compares with 3,114,348 tons moved in the like period of 1955. Lake shipping has not completely recovered from the steel and vessel strikes in July and August. Cumulative shipments of ore in the lake navigation season to Sept. 10 were 45,379,091 tons, about 13,500,000 tons under the Sept. 10, 1955 total.

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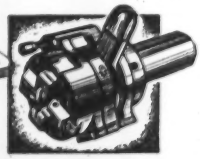

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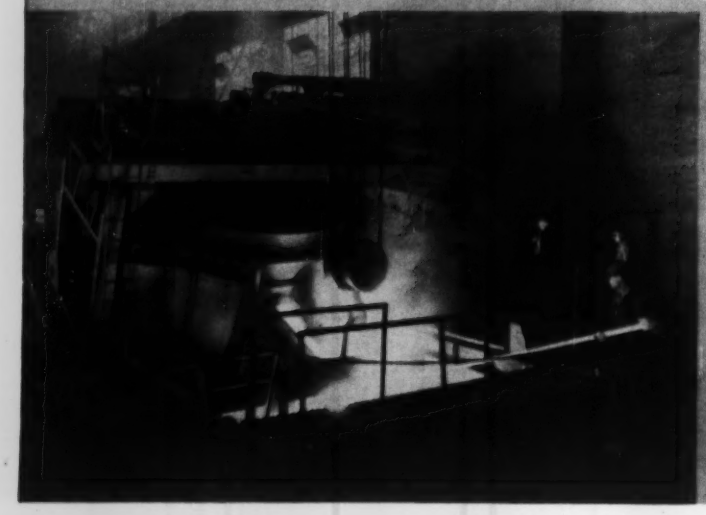

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Scrap Price Composite Advances

STEEL's index on the steelmaking grades scores further rise though market has lost some of its bullishness. High steel operations provide strong support

Scrap Prices, Page 248

Philadelphia—Steel scrap prices have leveled off with substantial tonnage coming out. Buying for export is more active in this area, with local dealers paying slightly higher prices than for domestic shipment tonnage. Rail crops are up $2 a ton.

Boston—While borings and turnings are slightly firmer, feverish steel scrap prices have cooled off, and are unchanged for the most part. For heavy melting grades, the highest prices continue to be paid for district shipment, brokers paying $51.50, shipping point, for a Massachusetts mill. The spread has narrowed between heavy melting steel bought for district consumption, export, and eastern Pennsylvania delivery.

Pittsburgh—The market continues strong, but prices are unchanged from those a week ago. No new buying is noted. Dealers and brokers say the market is marking time, pending new developments. Some think prices may have reached their peak. Some slight easing in the cast iron grades is noted, No. 1 cupola being quoted off $2 a ton.

Cleveland—The market here is marking time, following the recent sharp runup in prices. New buying is limited. Expectations are there will not be much market activity until later this month when October needs should come to the fore. Prices are holding, with No. 1 heavy melting at $62.50-$63.50.

Chicago—Prices are up another $2 to $3 on many items on new mill buying. Increases were scored on No. 1 heavy melting, which sold for $62; No. 1 factory bundles at $65; No. 1 dealer bundles at $57; and No. 1 railroad heavy melting at $65.

Material is moving freely despite price resistance, reflecting high level steel mill operations. One mill is reported increasing its production of synthetic scrap.

Stainless scrap prices are out of line, say secondary smelters, but they are paying the going quotations. Sales of 18-8 bundles and solids were made last week at $470.

Buffalo — The market is firm, but prices are uncertain as dealers await the placement of September needs by the leading local mill consumer. Some traders think the market will go up another $1 or $2 because district supplies of scrap are light. The movement of Buffalo scrap to the Youngstown area has subsided. Some scrap is moving into this area via the barge canal from the Atlantic seaboard.

Cincinnati—Prices have become stabilized here at levels established a week ago. No. 1 heavy melting steel is quoted at $57-$58.

St. Louis—The market is strong, with demand rising. Dealer grades are more active, including No. 2 heavy melting and No. 2 bundles. Generally, supplies are limited.

Detroit—No. 1 heavy melting is

(*Please turn to page* 253)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 12	$59.67
Sept. 5	58.83
Aug. Avg.	57.13
Sept. 1955	44.42
Sept. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	58.00-59.00
No. 2 heavy melting	51.00-52.00
No. 1 bundles	58.00-59.00
No. 2 bundles	47.00-48.00
No. 1 busheling	58.00-59.00
Machine shop turnings	39.00-40.00
Mixed borings, turnings	39.00-40.00
Short shovel turnings	43.00-44.00
Cast iron borings	43.00-44.00
Cut structurals, 3 ft lengths	67.00-68.00
Heavy turnings	53.00-54.00
Punchings & plate scrap	67.00-68.00
Electric furnace bundles	67.00-68.00

Cast Iron Grades

No. 1 cupola	*54.00-55.00*
Heavy breakable cast	50.00-51.00
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt	67.00-68.00
Rails, 2 ft and under	75.00-76.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	72.00-73.00
Railroad specialties	74.00-75.00

Stainless Steel Scrap

18-8 bundles & solids	395.00-405.00
18-8 turnings	275.00-290.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	62.50-63.50
No. 2 heavy melting	44.00-45.00
No. 1 bundles	62.50-63.50
No. 2 bundles	40.00-41.00
No. 1 busheling	62.50-63.50
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Low phos.	62.50-63.50
Cut structural plates 2 ft and under	68.00-69.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	62.50-63.50

Cast Iron Grades

No. 1 cupola	*57.00-58.00*
Charging box cast	50.00-51.00
Heavy breakable cast	48.00-49.00
Stove plate	54.00-55.00
Unstripped motor blocks	36.00-37.00
Brake shoes	44.00-45.00
Clean auto cast	56.00-57.00
Burnt cast	43.00-44.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	*83.00-84.00*
Rails, 18 in. and under	*84.00-85.00*
Rails, random lengths	*80.00-81.00*
Cast steel	69.00-70.00
Railroad specialties	74.00-75.00
Uncut tires	73.00-74.00
Angles, splice bars	75.00-76.00
Rails, rerolling	*82.00-83.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	65.00-66.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	65.00-66.00
No. 2 bundles	43.00-44.00
No. 1 busheling	65.00-66.00
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	65.00-66.00
Electric furnace bundles	65.00-66.00

Railroad Scrap

No. 1 R.R. heavy melt.	66.00-67.00

CHICAGO

No. 1 heavy melting	*61.00-62.00*
No. 2 heavy melting	47.00-48.00
No. 1 factory bundles	*64.00-65.00*
No. 1 dealer bundles	*57.00-58.00*
No. 2 bundles	43.00-44.00
No. 1 busheling	*56.00-57.00*
Machine shop turnings	35.00-36.00
Mixed borings, turnings	35.00-36.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut structurals, 3 ft	66.00-67.00
Punchings & plate scrap	67.00-68.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	47.00-48.00
Unstripped motor blocks	41.00-42.00
Clean auto cast	57.00-58.00
Drop broken machinery	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	*65.00-66.00*
R.R. malleable	71.00-72.00
Rails, 2 ft and under	*82.00-83.00*
Rails, 18 in. and under	82.00-83.00
Angles, splice bars	73.00-74.00
Rails, rerolling	*84.00-85.00*

Stainless Steel Scrap

18-8 bundles & solids	*450.00-470.00*
18-8 turnings	*350.00-370.00*
430 bundles & solids	*70.00-75.00*
430 turnings	52.50-57.50

DETROIT

Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*55.00*
No. 2 heavy melting	43.00
No. 1 bundles	*56.00*
No. 2 bundles	39.00
No. 1 busheling	*55.00*
Machine shop turnings	*30.00*
Mixed borings, turnings	*33.00*
Short shovel turnings	34.00
Punchings & plate scrap	*60.00*

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	25.00-26.00
Short shovel turnings	29.00-30.00
Machine shop turnings	29.00-30.00
Bar crops and plate	57.00-58.00
Structural & plate, 2 ft	56.00-57.00
Short steel turnings	34.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	51.00-52.00
Stove plate	49.00-50.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	50.00-51.00
Rails, 18-in. and under	71.00-72.00
Rails, rerolling	74.00-75.00
Rails, random lengths	65.00-66.00
Angles, splice bars	64.00-65.00

PHILADELPHIA

No. 1 heavy melting	59.00
No. 2 heavy melting	50.00
No. 1 bundles	59.00
No. 2 bundles	49.00
No. 1 busheling	59.00
Electric furnace bundles	61.00
Mixed borings, turnings	41.00
Machine shop turnings	41.00
Short shovel turnings	45.00
Heavy turnings	54.00
Structurals & plates	62.00-63.00
Coupiers, springs, wheels	68.00
Rail crops, 2 ft & under	*74.00-75.00*

Cast Iron Grades

No. 1 cupola	53.00-55.00
Malleable	68.00
Heavy breakable cast	*56.00-57.00*
Drop broken machinery	58.00-59.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	52.00-53.00
No. 2 bundles	41.00-42.00
Machine shop turnings	31.00-32.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	36.00-37.00
Low phos. (structural & plate)	53.00-54.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	48.00-48.50

Stainless Steel

18-8 sheets, clips, solids	350.00-360.00
18-8 borings, turnings	190.00-200.00
430 sheets, clips, solids	115.00-120.00
410 sheets, clips, solids	105.00-110.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	51.00-51.50
No. 2 heavy melting	*41.00-42.00*
No. 1 bundles	51.00-51.50
No. 2 bundles	*37.50-38.00*
No. 1 busheling	51.00-51.50
Machine shop turnings	*29.00-30.00*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*33.00-34.00*
No. 1 cast	44.00-44.50
Mixed cupola cast	39.50-40.00
No. 1 machinery cast	45.50-46.00

BUFFALO

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	43.00-44.00
No. 1 bundles	56.00-57.00
No. 2 bundles	40.00-41.00
No. 1 busheling	56.00-57.00
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	60.00-61.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	53.00-54.00

Railroad Scrap

Rails, random lengths	60.00-61.00
Rails, 3 ft and under	66.00-67.00
Railroad specialties	57.00-58.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	57.00-58.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	57.00-58.00
No. 2 bundles	44.00-45.00
No. 1 busheling	57.00-58.00
Machine shop turnings	35.50-36.50
Mixed borings, turnings	37.00-38.00
Short shovel turnings	40.00-41.00
Cast iron borings	37.00-38.00
Low phos., 18 in.	62.00-63.00

Railroad Scrap

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	62.00-63.00
Rails 18 in. and under	77.00-78.00
Rails random lengths	68.00-69.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*53.00*
No. 2 heavy melting	45.00
No. 1 bundles	*53.00*
No. 2 bundles	41.00
No. 1 busheling	*53.00*
Machine shop turnings	30.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	44.00
Heavy breakable cast	44.00
Unstripped motor blocks	43.00
Brake shoes	51.00
Clean auto cast	54.00
Stove plate	45.50

Railroad Scrap

No. 1 R.R. heavy melt.	*63.50*
Rails, 18 in. and under	80.00
Rails, random lengths	*77.00*
Rails, rerolling	*86.00*
Angles, splice bars	70.00

SEATTLE

No. 1 heavy melting	50.00
No. 2 heavy melting	46.00
No. 1 bundles	42.00
No. 2 bundles	31.00
Machine shop turnings	25.00-27.00
Mixed borings, turnings	25.00-27.00
Electric furnace No. 1	58.00-60.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Heavy breakable cast	42.00-44.00
No. 1 wheels	37.00
Unstripped motor blocks	44.00
Stove plate (f.o.b. plant)	35.00-37.00

LOS ANGELES

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	43.00
No. 2 bundles	33.00
Machine shop turnings	25.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00

SAN FRANCISCO

No. 1 heavy melting	50.00
No. 2 heavy melting	47.00
No. 1 bundles	48.00
No. 2 bundles	42.00
Machine shop turnings	30.00
Mixed borings, turnings	30.00
Cast iron borings	30.00
Heavy turnings	30.00
Short shovel turnings	33.00
Cut structurals	58.00

Cast Iron Grades

No. 1 cupola	55.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	47.00
Clean auto cast	55.00
No. 1 wheels	45.00-47.00
Drop broken machinery	55.00

HAMILTON, ONT.

No. 1 heavy melting	*52.00*
No. 2 heavy melting	*47.00*
No. 1 bundles	*52.00*
No. 2 bundles	*42.50*
Mixed steel scrap	*46.00*
Busheling, new factory:	
Prepared	*50.00*
Unprepared	*46.00*
Short steel turnings	*34.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

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World Copper Prices Steady

Though unrest is growing in Northern Rhodesia, copper prices are holding fast. Aluminum sales in the third quarter will come within 5 to 10 per cent of same period last year

Nonferrous Metal Prices, Pages 252 & 253

THE SUEZ crisis, plus a serious strike of copper miners in Northern Rhodesia, is having little effect on the London Metal Exchange quotation for the red metal. Wednesday's asking price was 38.4 cents a pound.

Reasons — Tight credit restrictions in London may be having some effect on the buying habits of British industry. European demand during the past week also has been spotty. Another deterrent to higher LME prices may be that Britain has some 36,000 tons of copper in stockpile which it intends to release in increments of 6000 tons. London metal men may be hesitant to raise prices, forcing the government to "dump."

Domestic prices continue at the 39-cent-a-pound level for custom smelted copper, 40 cents a pound for primary. Some brass mills are still reluctant to order substantial tonnages, waiting for further orders from motordom.

Crux—Demand has slipped a bit in September, but October bookings should be at peak levels.

Aluminum Sales Off

Aluminum sales during the third quarter will probably come within 5 to 10 per cent of last year's third quarter totals. The fourth quarter will rack up records in primary production and mill sales. Utility cable sales are holding at high levels. Foil demand has dipped, but spokesmen point out that the military is using less foil.

One problem: Extruders are being caught in a financial squeeze. They are having difficulty getting money for new equipment, and collections from many customers are taking up to 90 days.

While there is growing talk about supply catching up with demand, large independent fabricators are admitting (off the record) that sales are from 10 to 30 per cent better than 1955's. Says one fabricator: "This is just the calm before the storm. Wait until Detroit starts to turn out 1.8 million cars during the fourth quarter."

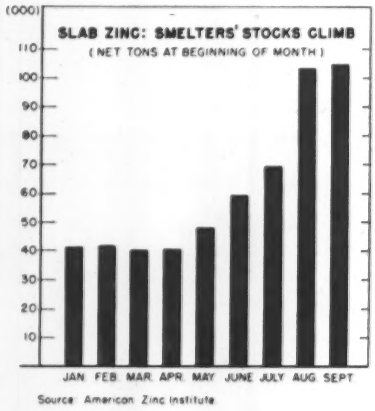
Aluminum note: The Miami-to-Jacksonville Florida Turnpike will consume more aluminum per mile than any other highway project in history. Aluminum signs and sign posts, light standards and bridge railings will be used.

Die-Casting Sales Down

The American Diecasting Institute reports that the 1956 production of zinc diecastings appears to be headed for a total of 355,000 tons — a 13 per cent drop from 1955 totals. The institute points out that a solid 15 per cent gain in nonautomotive applications by job shops has been a lifesaver. Automotive shipments have declined 32 per cent. Production of aluminum diecastings will be down about 5.5 per cent. The estimated total for the year is 166,000 tons. Last year's mark was 176,000 tons. Magnesium and brass diecastings are registering about an 8 per cent gain over 1955 results, says the institute.

Zinc Picks Up

Domestic zinc shipments jumped from 34,219 tons in July to a more respectable level of 70,709 tons in August. Total shipments were 88,019 tons (domestic, export and drawback and governmental accounts). Primary production in August reached 89,569 tons. Stocks (see chart) still increased slightly.



Source: American Zinc Institute

Market Memos

- International Nickel Co. has advanced the price on mill products (see page 252).
- The Atomic Energy Commission will buy 500 tons of reactor-grade beryllium metal at an average cost of $47 a pound. The Beryllium Corp. and Brush Beryllium Co. each will supply 250 tons on a unit price basis over a five-year period.

NONFERROUS PRICE RECORD

	Price Sept. 12	Last Change		Previous Price	Aug. Avg.	July Avg.	Sept., 1955 Avg.
Copper	39.00–40.00	Aug.	22, 1956	39.50–40.00	39.750	40.030	45.380
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	14.920
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	12.940
Tin	104.50	Sept.	11, 1956	101.75	99.043	96.435	96.565
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug.	10, 1956	25.90	26.700	25.900	24.400
Magnesium	35.25	Aug.	13, 1956	33.75	34.694	33.750	32.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

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Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 50-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 39.00 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 +%, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b., Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 104.50, prompt, 104.25.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10.00 per lb; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.00-27.75; No. 12 foundry alloy (No. 2 grade), 26.50; 5% silicon alloy, 0.60 Cu max, 28.00-28.25; 13 alloy, 0.60 Cu max, 28.00-28.25; 195 alloy, 28.00-28.75; 108 alloy, 26.50-27.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 26.25; grade 2, 25.50; grade 3, 24.75; grade 4, 24.25.

Brass Ingot: Red brass, No. 115, 37.55; tin bronze, No. 225, 48.00; No. 245, 43.50; high-leaded tin bronze, No. 305, 41.00; No. 1 yellow No. 405, 29.75; manganese bronze, No. 421, 33.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy) Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 45.35¢; l.c.l., 45.95. Weatherproof, 30,000-lb lots, 43.78; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.68; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets C.R.	113	97	118
Strip, C.R.	111	99	128
Plate, H.R.	107	96	111
Rod, Shapes, H.R.	94	80	99
Seamless Tubes	144	120	190

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	54.20
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

ALUMINUM (continued)

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-56.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Tread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.00-16.50; old sheets, 13.00-13.50; borings and turnings, 9.00-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	SCRAP ALLOWANCES f Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.86c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.10	42.65d	52.64	55.01	27.250	27.000	25.125
Low Brass, 80%	55.85	55.79	56.39	58.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.84	33.125	32.875	32.375
Manganese Bronze	59.46	53.56	53.80	....	25.250	25.000	24.500
Munts Bronze	53.84	49.85	....	....	25.625	25.375	24.875
Naval Brass	55.72	50.02	62.78	58.88	25.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.28e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.09g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

9.00; crankcases, 14.00-14.50; industrial castings, 14.00-14.50.

Copper and Brass: No. 1 heavy copper and wire, 30.25-30.75; No. 2 heavy copper and wire, 28.75-29.50; light copper, 26.25-26.75; No. 1 composition red brass, 25.50-26.00; No. 1 composition turnings, 25.00-25.50; yellow brass turnings, 15.00-15.50; new brass clippings, 23.00-23.50; light brass, 14.50-15.00; heavy yellow brass, 16.50-17.00; new brass rod ends, 21.00-21.50; auto radiators, unsweated, 19.50-20.00; cocks and faucets, 19.50-20.00; brass pipe, 20.50-21.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.50-14.00.

Monel: Clippings, 80.00-90.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 80.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 20.00-20.50; 3003 clippings, 20.00-20.25; 6151 clippings, 20.00-20.25; 5052 clippings, 20.00-20.25; 2014 clippings, 19.00-20.00; 2017 clippings, 19.00-20.00; 2024 clippings, 19.00-20.00; mixed clippings, 19.00; old sheets, 17.50; old cast, 17.50; clean old cable (free of steel), 19.25-20.00; borings and turnings, 17.00-18.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 35.00; No. 2 heavy copper and wire, 32.00; light copper, 29.75; refinery brass (60% copper) per dry copper content, 30.75.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 35.00; No. 2 heavy copper and wire, 32.00; light copper, 29.75; No. 1 composition borings, 29.50; No. 1 composition solids, 30.00; heavy yellow brass solids, 20.50; yellow brass turnings, 19.50; radiators, 23.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval, 57.54, 5000-10,000 lb; electrodeposited, 50.28; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. Prices eastern delivery.

Tin: Bar or slab; less than 200 lb, $1.205; 200-499 lb, $1.190; 500-999 lb, $1.185; 1000 lb or more, $1.180.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50; prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35; prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 72.30; 100-600 lb, 63.80; 700-1900 lb, 61.30; 2000-9900 lb, 59.60; 10,000 lb or more, 58.40.

Stannous Chloride (anhydrous): Less than 25 lb, $1.696; 25 lb, $1.346; 100 lb, $1.196; 400 lb, $1.171; 5200-19,600 lb, $1.049; 20,000 lb or more, 92.70.

Stannous Sulphate: Less than 50 lb, $1.322; 50 lb, $1.022; 100-1900 lb, $1.002; 2000 lb or more, 98.20.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(Concluded from page 247)

quoted at $55 here. So is No. 1 busheling, with No. 1 bundles at $56. Other changes include machine shop turnings at $30, mixed borings and turnings at $33, punchings and plate scrap at $60. Prices on the cast iron grades are unchanged.

Birmingham—With major local consumers out of the market since shortly after the steel strike ended, most open-hearth scrap is moving to northern markets, or is being exported. Little effort is being made here to build inventories. Brokers think prices will advance when the local mills resume buying. Electric furnace and cast iron grades are strong but unchanged in price.

Seattle — The scrap market is firm, with No. 1 heavy melting $50 and No. 2, $46. Dealers say these levels set all-time highs for this area. Mills are buying in volume, and exports continue to be active. Receipts are heavy.

Interest centers on a sale of 10,500 tons of Alaska railroad scrap to the Commercial Metals Co., Dallas. This material was bid at $448,980, f.o.b. cars, Anchorage or Seward.

Los Angeles—Although the market continues strong, some price fluctuation is noted.

CLASSIFIED ADVERTISING

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Help Wanted

SUPERVISOR FOR MAINTENANCE MACHINE shop for cold rolling specialty mill. Mechanical Engineering degree desirable but not necessary. Write furnishing resume of experience, education and salary expected to Box 467, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR CLASSIFIED RATES

And Further information write
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SALARY: Commensurate with qualifications and past experience.

Please send resume, present salary, and salary requirements to:

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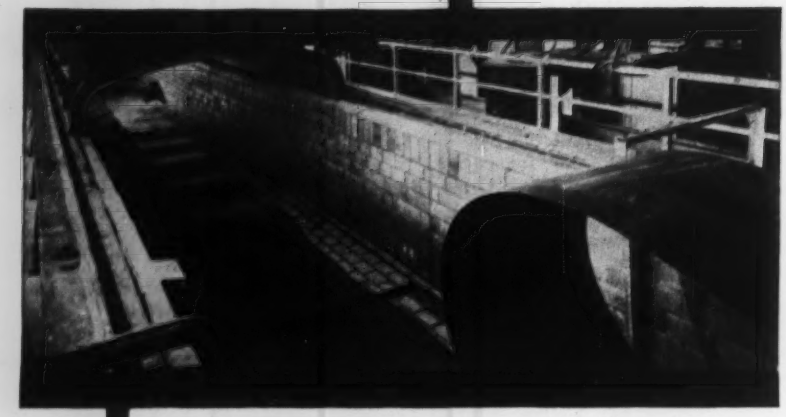

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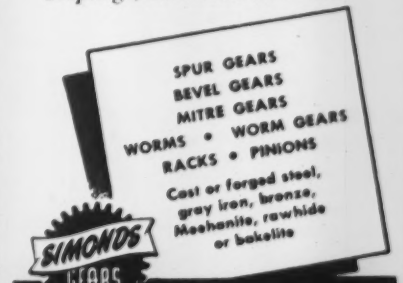

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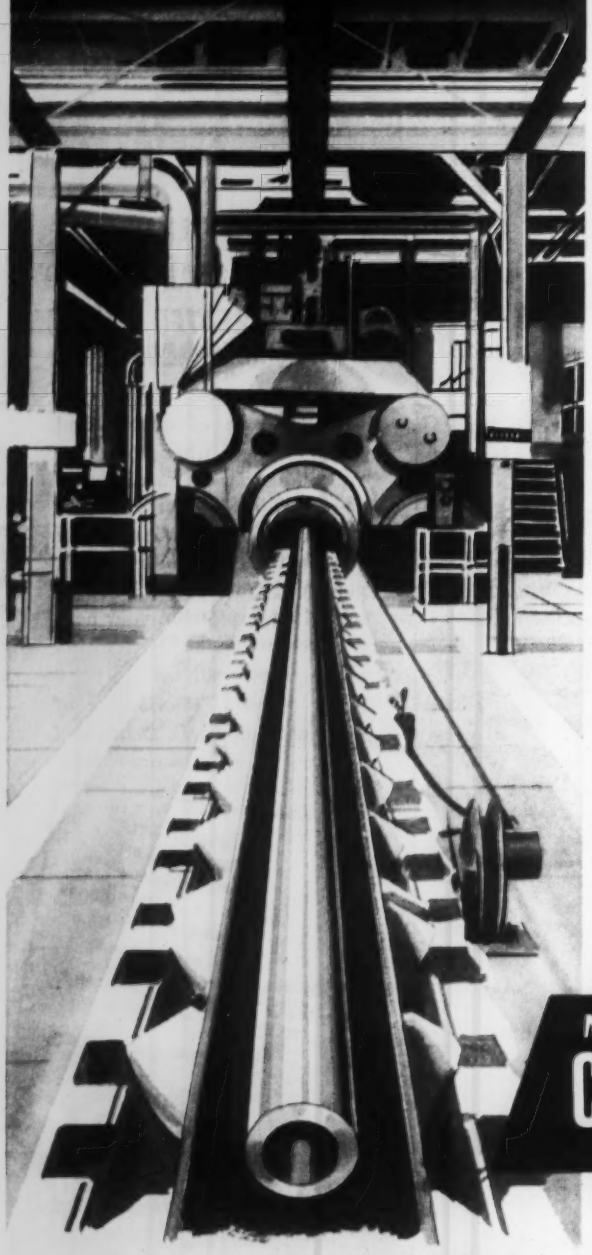

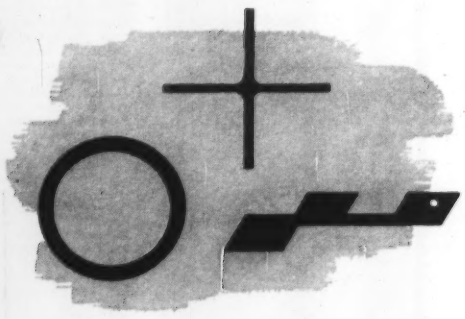

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